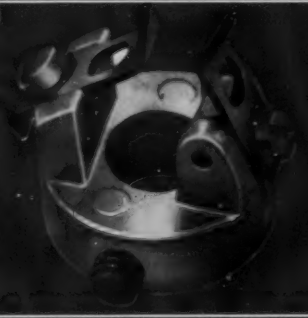
FEBRUARY 1961

Precision Metal Molding

INCLUDING DIE CASTINGS MAGAZINE

DO YOU WANT TO CUT COSTS ?

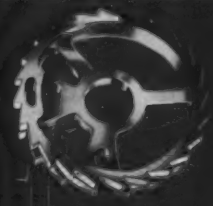


Consult your die caster

SEE PAGE 30

Have you considered investment casting?

SEE PAGE 34



Most industries can use extrusions

SEE PAGE 36

TAKE A LOOK AT THE NEW ZINC DIE CASTING ALLOY

SEE PAGE 29

N INDUSTRIAL PUBLISHING CORPORATION MAGAZINE

PMM

The magazine for design, finishing and the use of:

SINTERINGS • INVESTMENT CASTINGS • EXTRUSIONS
PLASTER MOLD CASTINGS • SHELL MOLD CASTINGS
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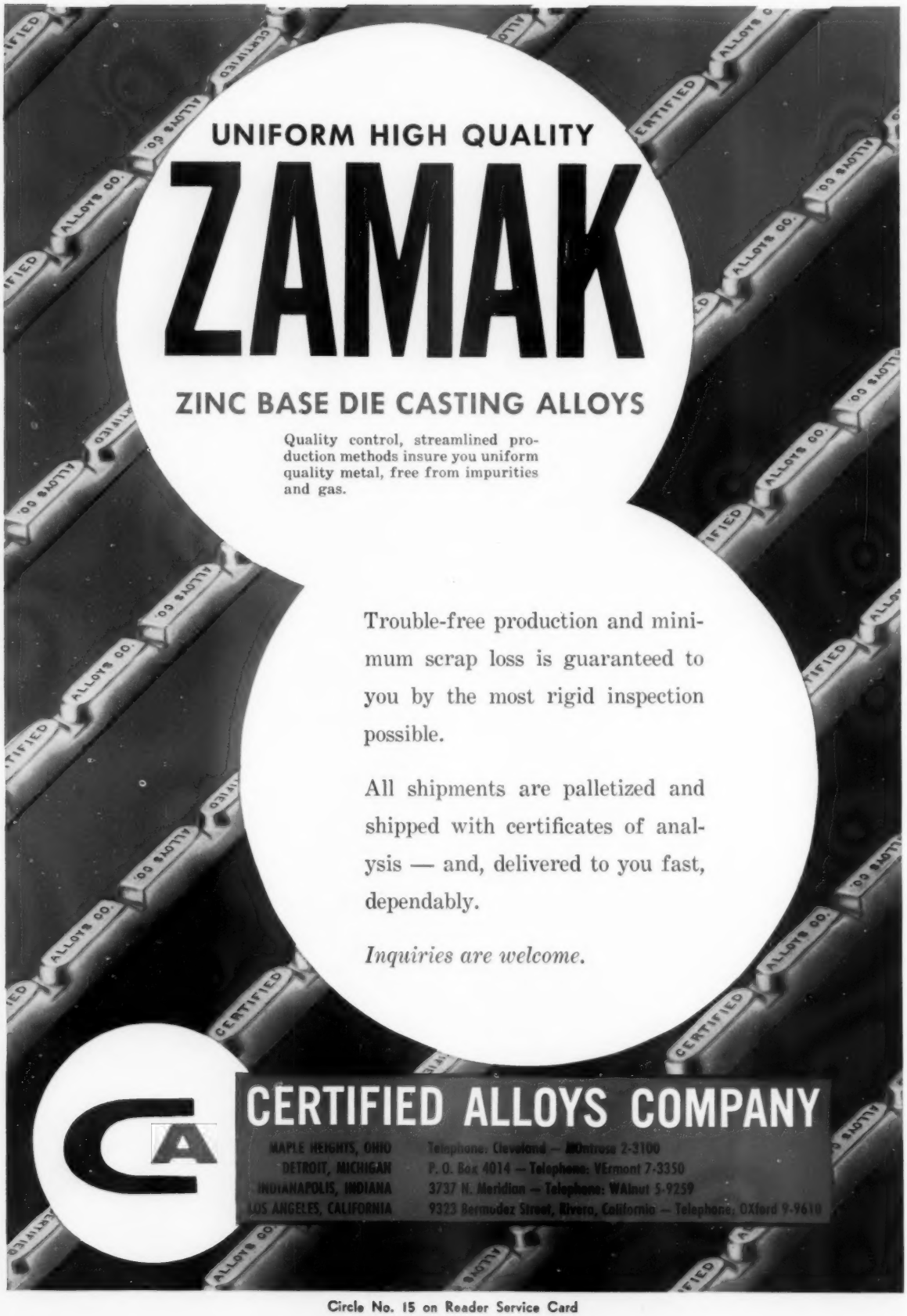
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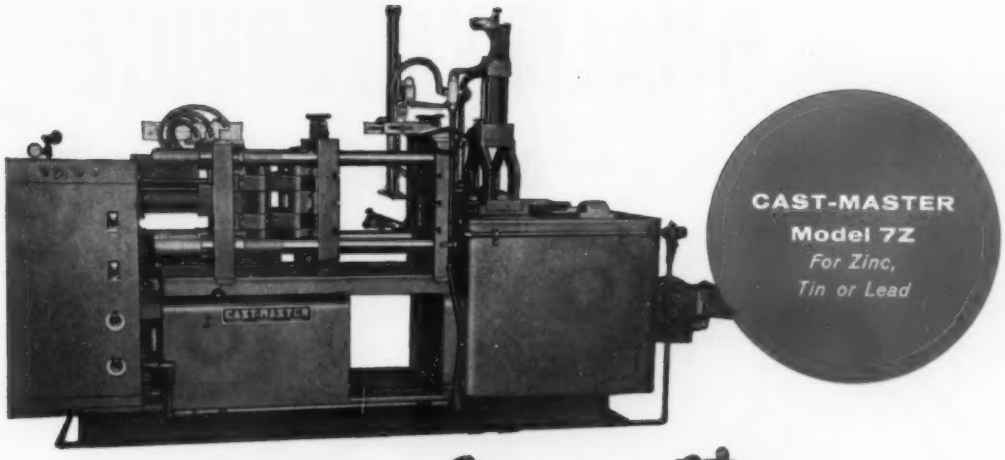

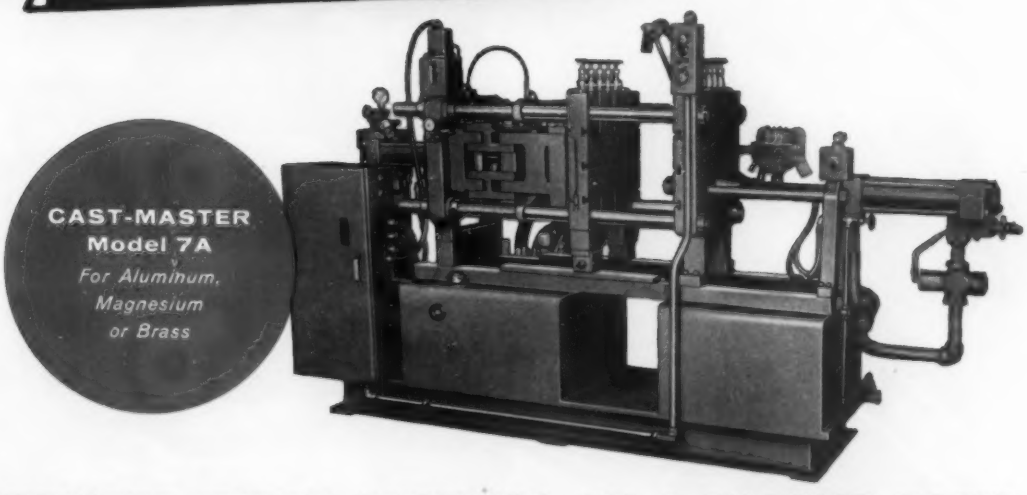

HARDWARE FINISH CASTINGS ON A VOLUME BASIS

SPECIFICATIONS

	Model 7Z	Model 7A
Die Locking Pressure	100 tons	100 tons
Distance between rods HxV	13½" x 13½"	13½" x 13½"
Tie rod centers, HxV	16" x 16"	16" x 16"
Tie rod diameter	2½"	2½"
Die mounting plates, TxHxV	3½" x 21½" x 21½"	3½" x 21½" x 21½"
Die thickness	4" min., 19" max.	4" min., 19" max.
Die stroke	4" min., 8" max.	4" min., 8" max.
Shot position	On center or 4" below	3½" below center
Shot cyl. dia.	2½"	3⅜"
Shot cyl. stroke	6½"	11"
Machine size, WxLxH	48" x 120" x 72"	48" x 120" x 58"
Weight, gross	6,900 lbs.	6,400 lbs.

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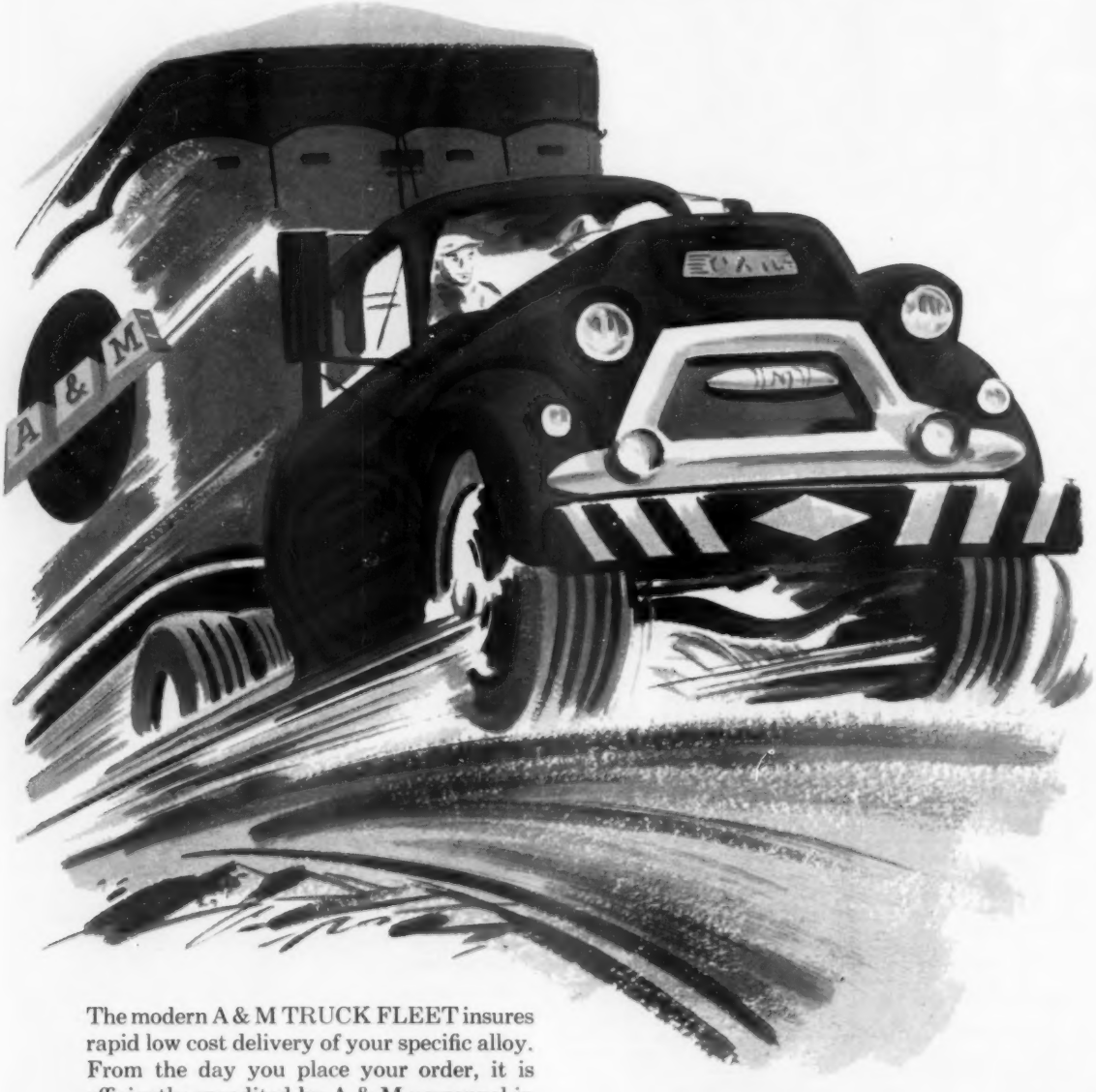

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PRECISION METAL MOLDING

PMM in this issue

February, 1961: Volume 19 Number 2

FEATURE ARTICLES

29 **NEW ZINC DIE CASTING ALLOY**

The new No. 7 zinc die casting alloy promises more flexible design, faster production.

30 **IMPROVED PRODUCT DESIGN**

Actual cases illustrate how die casters benefit through vendor-buyer consultations.

34 **SINTERED LEVER IS AS DURABLE AS STEEL**

Because of a steel strike, one manufacturer redesigned for sintering and found costs cut as machining and scrap were eliminated.

34 **CRITICAL TOLERANCES ARE HELD ON INVESTMENT CAST CLUTCH-PLATES**

This is one of many applications where the manufacturer has cut costs on parts by limiting machining operations.

36 **ALUMINUM EXTRUSIONS ARE VERSATILE**

Transformer housings perform better, are easier to fabricate.
Aluminum replaces wood as sailboat mast.
Extruded strip replaces part machined from bar stock.
Racks with "built-in" good looks cost less.
Extrusions permit more functional design.

40 **SINTERED VALVE COVER**

An exhaust cover was switched from sand casting to sintering with a resultant 82% cut in costs, better product appearance.

47 **DIE CAST FOR SALES APPEAL**

Stromberg-Carlson uses die cast parts to add appeal to its Hi-Fi components.

60 **WASHING MACHINE AGITATOR REQUIRES LITTLE BUFFING**

Die cast in a three-part die, the agitator requires little buffing or grinding. Production costs are cut, scrap loss and finishing costs, down.

FINISHING SECTION

43 **BARREL FINISHING DIE CASTINGS**

A new barrel finishing compound will provide a broader range of zinc die castings a finish that will produce a better color and higher luster.

45 **JEWELRY FINISH PLATING ON ZINC DIE CASTINGS**

To get a jewelry finish on die castings, keep the finish in mind from design right on through all production steps.

DEPARTMENTS

10 Casting About
14 Letters
21 New Products
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51 Useful Literature
62 Books
63 Opportunities

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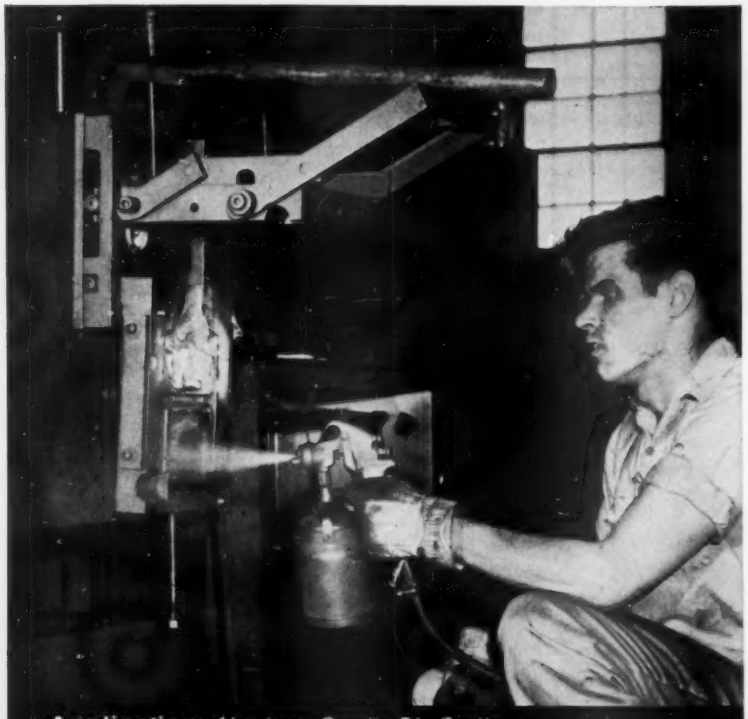
DIE CASTING REPORT



Application: *Aluminum Gravity Die Castings.*
Problem: *To obtain a micro-smooth surface finish.*
Solution: *'Aquadag®' and 'dag®' Dispersion 193 — diluted with water in varying ratios depending upon the job requirements; spray-applied.*

RESULT: *SURFACE FINISHES ON ALUMINUM CASTINGS AS SMOOTH AS 40 to 60 MICROINCHES*

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The consistent uniformity, quality performance, and versatility of Acheson mold coatings for metal casting, are covered in Bulletin No. 425. Send for your copy, care of Dept. PMM21.

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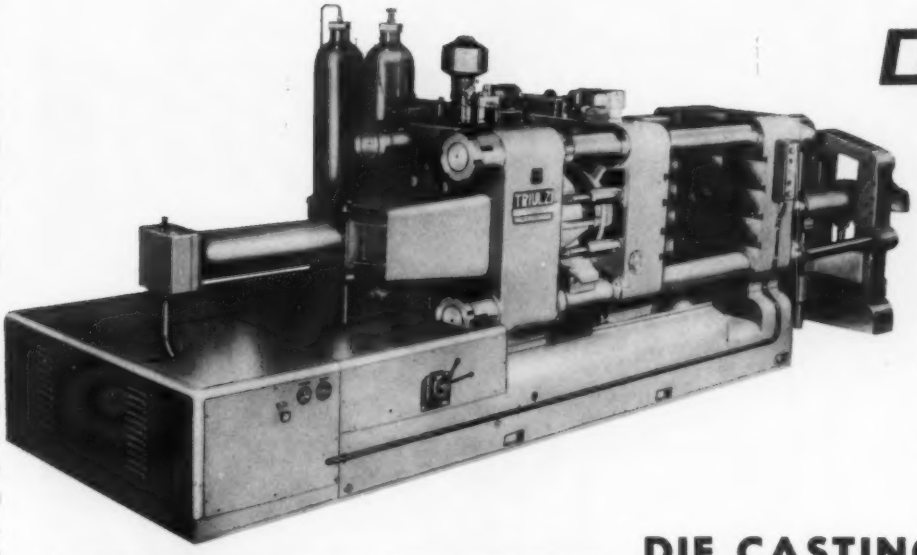

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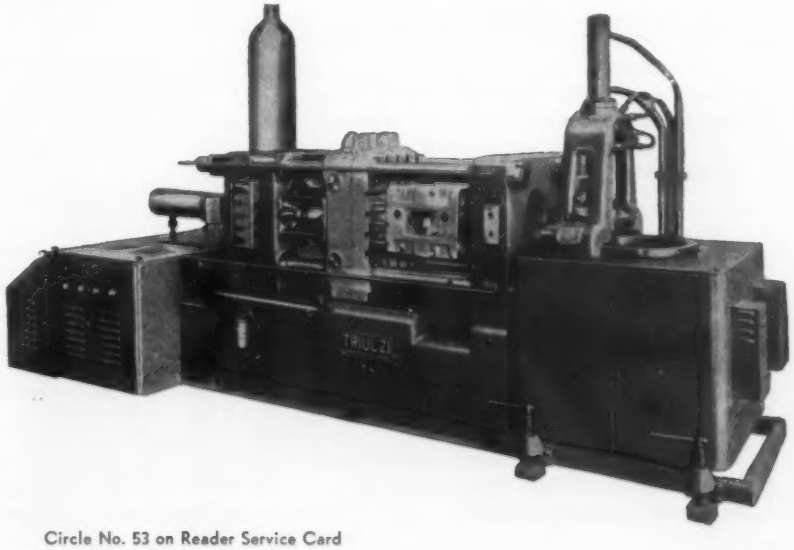

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Are you burning PROFITS in your furnaces?

Coreless electric induction furnaces cut operating costs and metal losses. Savings often pay for furnace in 1 year!

In today's highly competitive foundry business you can't afford out-dated methods and equipment. With rising labor and material costs, keeping pace with technological advances has become a do-or-die proposition. Progressive foundrymen the world over are learning that one of the quickest, surest ways of lowering production costs and improving quality is to convert to the coreless line frequency electric induction furnace pioneered by Brown Boveri. Many of them have paid for their original installation out of savings in the first year of operation! Proven designs available for every metal and in sizes to suit every application. Check the advantages listed below against your present equipment, then write us today for a full story on how Brown Boveri furnaces can put your foundry out ahead in the competitive race.

Advantages

1. Cooler, cleaner foundry conditions . . . no need for a separate melting building or for summer shutdowns due to excessive heat . . . better labor-management relations.

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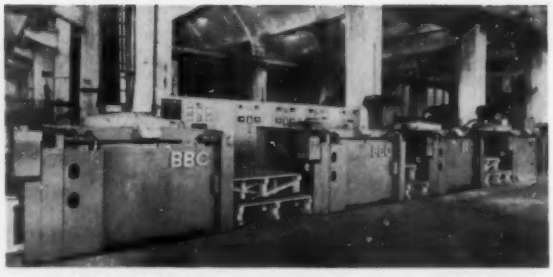
3. No channels to be clogged . . . no frequency converter . . . no electrode consumption.

4. Rapid starting and stopping . . . no need to hold furnaces at temperature between shifts or over weekends.

5. Easier ramming of crucible lining . . . long lining and crucible life . . . simple crucible replacement.

6. Highest quality castings . . . less casting scrap . . . lowest gas content in metal.

7. Simple, foolproof design . . . no need for skilled operators . . . entire installation handled from central station with single push-button control . . . automatic power factor and automatic safety monitoring . . . one man can supervise several furnaces.



Brown Boveri line frequency installation for melting aluminum; each furnace rated 1.3 tons, 360 kw and 380 v.

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9. Much greater use of scrap and borings for greater economy with minimum oxidation loss . . . cheaper materials produce product of high quality.

10. Hydraulic tilting mechanism . . . safety and precise control . . . hydraulic, heat-insulated furnace lid can be opened and closed in any furnace position.

11. Best alloying conditions. Perfect blending due to natural stirring action . . . most exact composition of alloys and full conservation of alloying elements . . . alloy additions made easily without segregation . . . quick changeover from one alloy to another.

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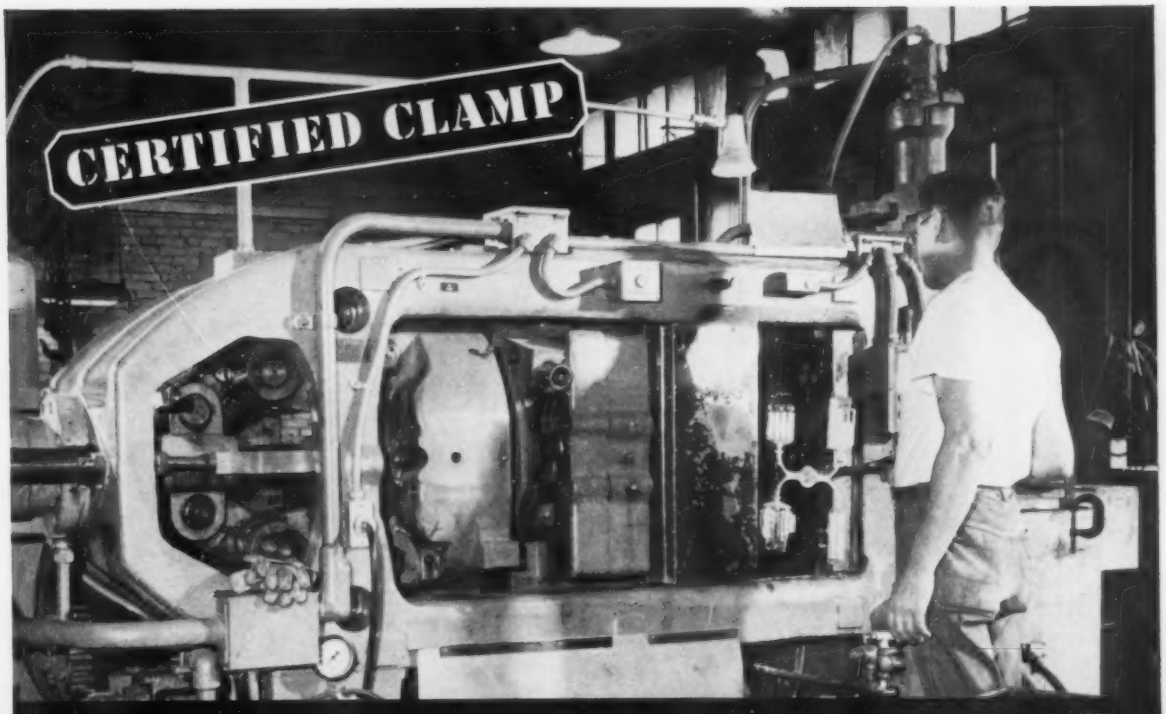

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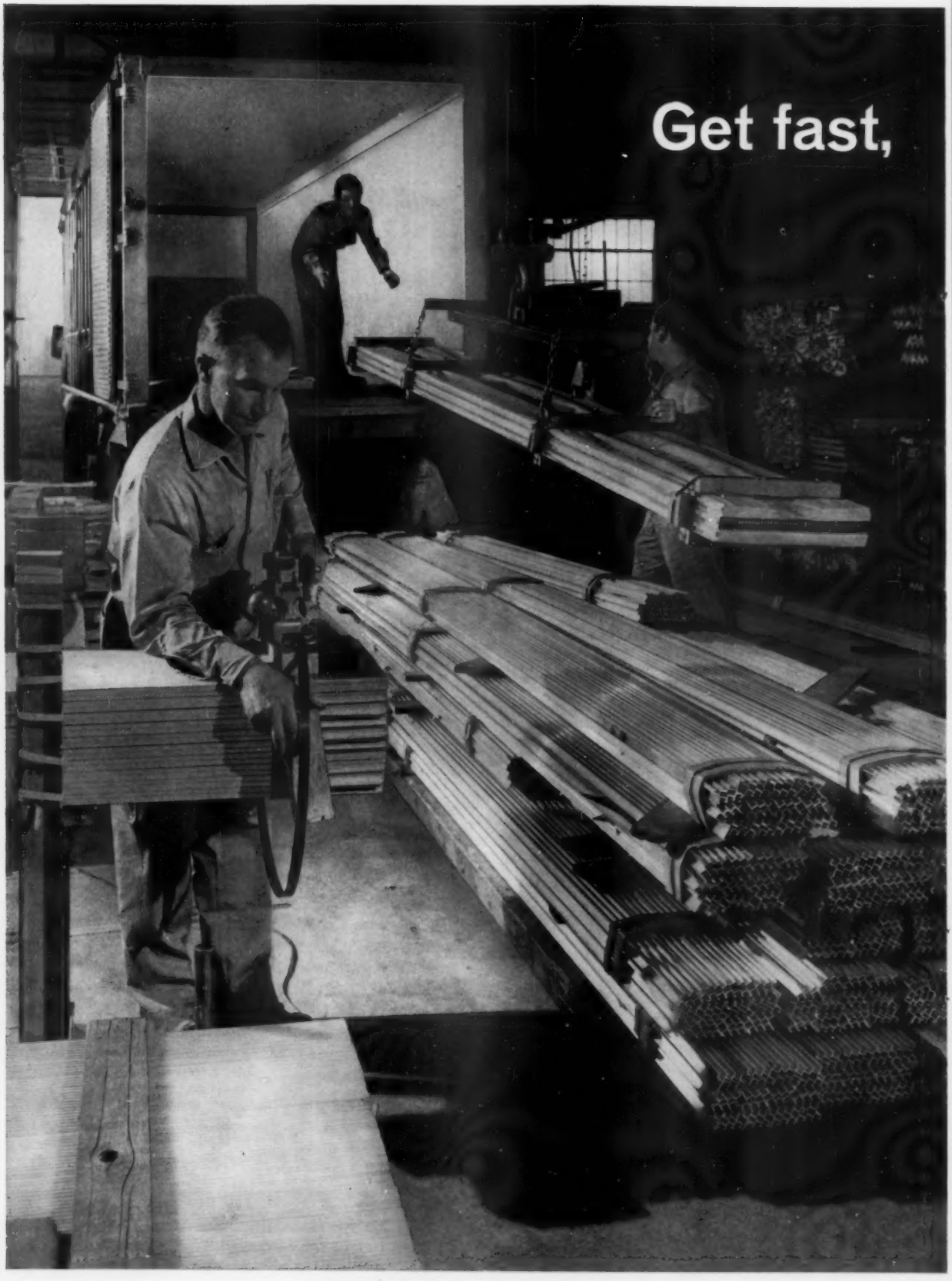
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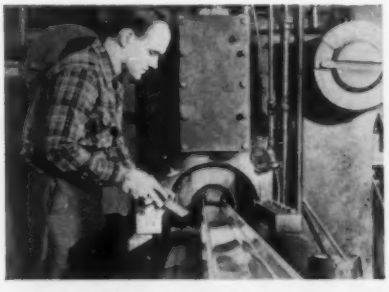

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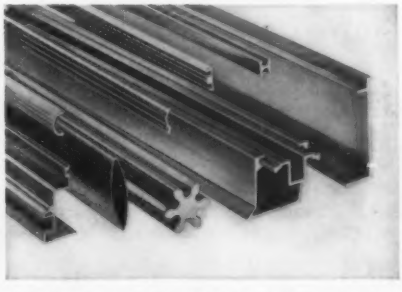

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casting about *technical news of applications & processes involving precision metal molding*

Record Achievement in Extruding Aluminum

These one-piece panels are a record achievement in the art of extruding aluminum, according to the Aluminum Company of America. The extrusions are 65 feet long, 18½ inches wide, and have 24 internal parallel channels running the full length of the part. Each of the channels is 1/2 inch wide and 3/16 inch high. They are spaced 1/4 inch apart.

Made from aluminum 6063, the extrusions are used to form cabinets housing electronic equipment in high altitude aircraft. Cool air flowing through the channels will maintain the equipment at optimum operating temperatures.

Alcoa extrudes these panels on a 14,000-ton press using a special bridge-type die.

New Technique for Bonding Copper by Diffusion

A new method for bonding copper to copper by diffusion has been developed by the Chase Brass & Copper Company. In the bonding process a special coating on the metal surface diffuses into the parts to be joined. Under the proper conditions, this produces a homogeneous bond without an interface, as strong or stronger than the base metal, according to Chase.

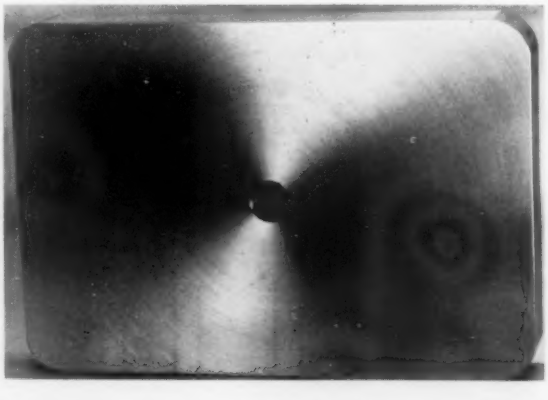
Tests on diffusion bonded joints have shown them to be markedly superior to soft soldered joints in tensile, shear, and fatigue properties. Corrosion resistance of the bonds in all media is expected to be higher.

Titanium Sintering Produced by Special Process

This titanium sintering is produced by a special powder metallurgy process developed by the Mechanical Research Division of Clevite Corporation. Measuring approximately 5 x 7 x 1 inch, the part represents one of the largest marine applications of titanium.

Use of powder metallurgy made possible the elimination of several costly machining operations while maintaining close dimensional control. Substantial cost savings were gained.

The physical, mechanical, and corrosion-resistant properties of the part are comparable to those of wrought titanium. Since the part is exposed directly to salt water, this corrosion resistance is an important factor. The application of the part is still classified information.



Small in cost!
Medium in size!
Large in performance!

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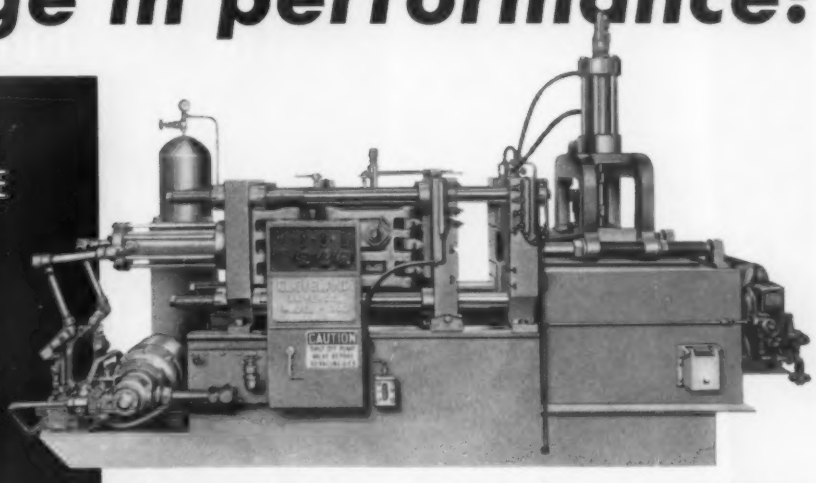
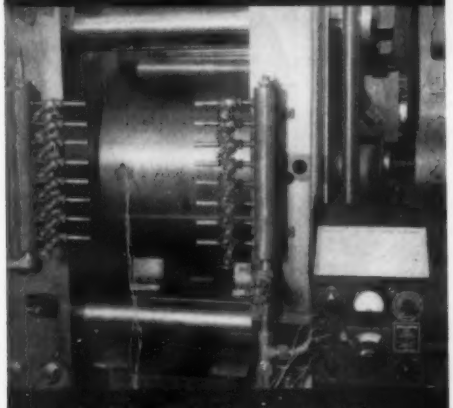
★ Certified by Independent Research Laboratory personnel *(H. C. Nutting Co.)*

★ Test results filed with the Society of Die Casting Engineers





★ Cleveland Die Casting Machine being tested for clamping capacity using SDCE calibrated test ring method.

All machines are strain gauge tested and conservatively rated under actual locking pressure. *This 200 ton machine actually tested 274 tons by the SDCE test.*

200 TON CLEVELAND
DIE CASTING MACHINE

For high-speed production of hardware-finish castings, weighing up to 12.5 lbs. zinc, or 4.9 lbs. aluminum, the Cleveland Model 200 has no equal. This medium-size, rugged Cleveland offers die casters a proven design that will give maximum production at the lowest possible operating cost.

Among its many features are: 3½" dia. alloy steel tie bars . . . 29" x 31" die plates with 5¾" thick movable platen . . . . adjustable die stroke—accommodates dies from 4" to 19" in thickness . . . extra-rugged toggle mechanism . . . large capacity Vickers hydraulic pumps driven by 15 hp motor—provide high injection speed and "squeeze" to the shot . . . plus many other construction qualities that have made the name "Cleveland" on die casting machines stand for reliability and economy in quality castings production.

You can look to Cleveland to meet your die casting machine needs exactly. Builders of a complete line of strain gauge tested machines in 100, 200, 400, 650, 850, 1000 and 2000 ton capacities. Call in a Cleveland sales engineer, or write direct, for detailed information. Better still, schedule your visit to Cleveland's Development Center to see the latest advances in fully automated and vacuum die casting.

Sales Offices: Chicago • Cleveland • Detroit • Hartford • Springfield, N. J.

CLEVELAND AUTOMATIC MACHINE COMPANY
4952 Beech Street • Cincinnati 12, Ohio

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

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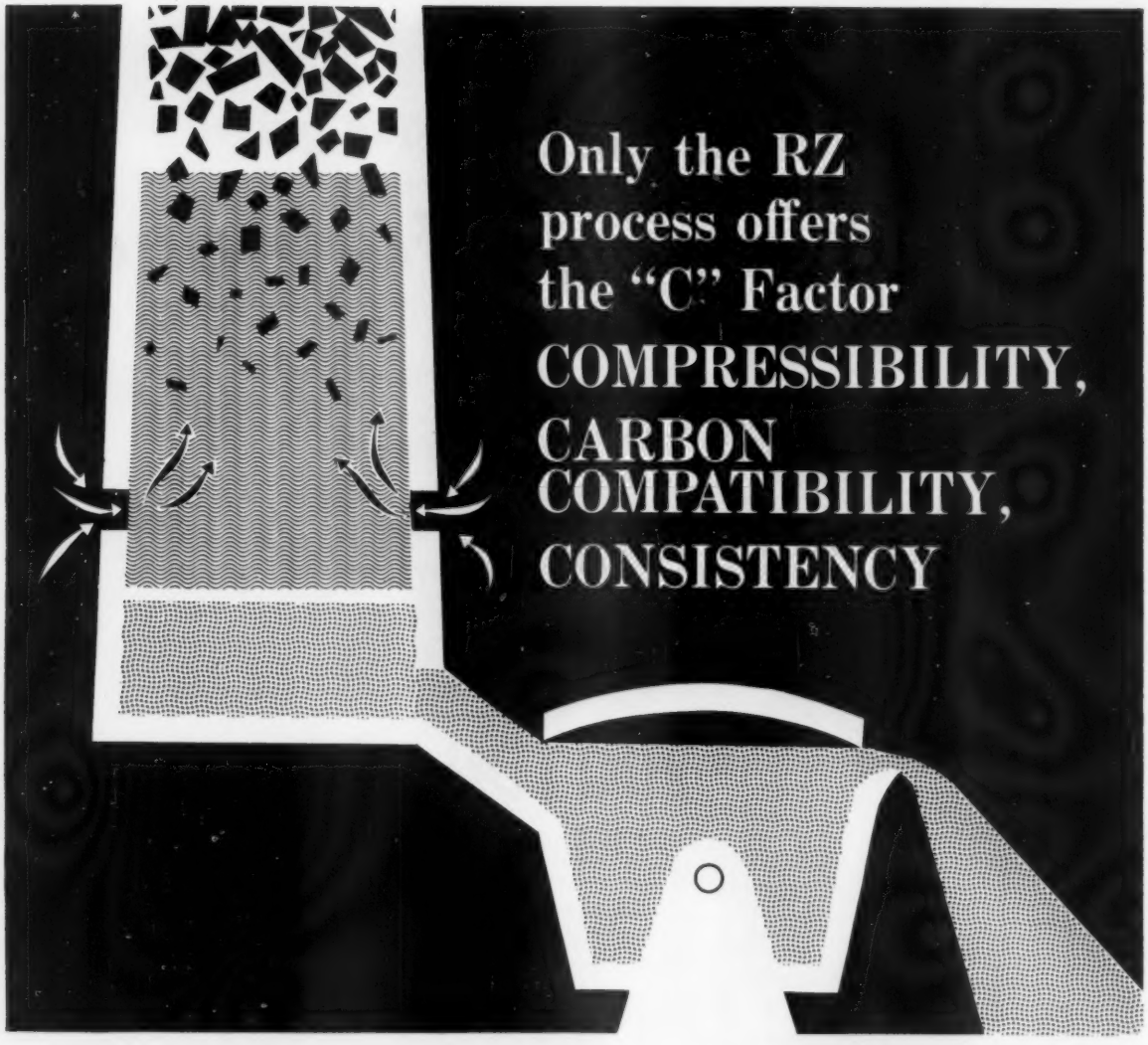

The RZ Process utilizes the established and proven advantages of liquidous metallurgy to produce a spherical ferrous powder designed to the critical applications of the powder metallurgy process. Easton RZ powders are available in the following grades:

Molding grade powders
RZ 365
RZ 365–HD
RZ 365–M
RZ 365–P
RZ 365–S
RZ–200
RZ–4600 Alloy

Special powders
RZ–8
RZ–F

Magnetic inspection powders
RZ–MIM
RZR–MIM
RZB–MIM

"Sintrex" electrolytic grade powders
D–E–F

Cutting & scarfing powders
Ferroflame Types A–B–C

Custom powders
1. Preblends
2. Customer Specifications

EASTON METAL POWDER COMPANY

EASTON RZ

Division of American Mannex Corporation

900 Line Street, Easton, Pa.

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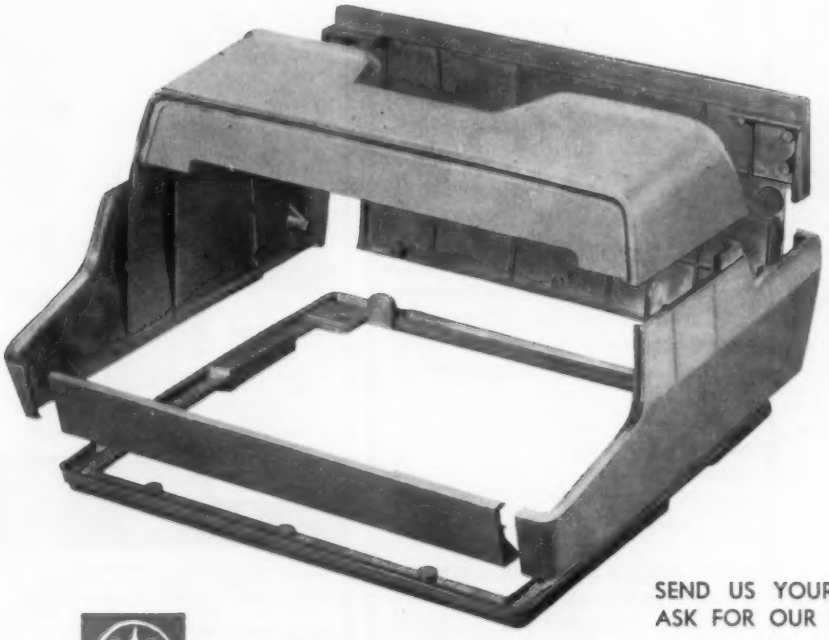
The new Remington Electric is . . . stronger, lighter, more stylishly designed with a *Premier* aluminum die cast housing



DESIGNED FOR DIE CASTING AT PREMIER where quality zinc and aluminum die castings are made. Let Premier solve your design and production problems on *any* business machine.

- VACUUM CASTING
- AUTOMATIC LADLING

for

Thinner Wall Sections
Minimum Porosity
Constant Quality
Improved Surfaces

SEND US YOUR PRINT FOR QUOTATIONS.
ASK FOR OUR FREE FACILITIES BROCHURE.

Premier **DIE CASTING COMPANY**

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THE
FREEDOM
DiMENSiON

. . . is shape flexibility

The investment casting process allows a new *freedom of design* . . . in shape . . . in materials. You can now design for function—the way you want the part!

This functionally designed instrument chassis was poured as an investment casting without design compromise. Dozens of expensive and complicated machining operations would otherwise have been required. Check your design with Hitchiner—in many cases you can buy *just what you want.*

Write for complete technical and facilities information.

HITCHINER
Milford 1, New Hampshire

Circle No. 27 on Reader Service Card

PMM letters

the readers' forum

SPECIFICATIONS FOR PAINTED CASTINGS

We would like to enlist your assistance in helping us locate specifications and tests regarding the use in outdoor applications of painted zinc die castings, aluminum die castings and aluminum permanent mold castings.

We would also like to find comparative data on the preparation of each type of casting for this usage and an indication as to what tests are considered acceptable for commercial (non-government) use. G. W. F.—Purchasing Department.

The American Society for Testing Materials has a large number of standards on paints and painted surfaces. Perhaps this reader can find the specifications he needs from among these ASTM standards.

Allied Research Products Company, 4004 East Monument St., Baltimore, Maryland, makes a number of specific materials for the surface preparation of zinc and aluminum die castings prior to painting. If there are any non-government tests for painted surfaces, they probably know about them.—Ed.

PERMANENT MOLD CASTING

We are in the hardware business and are currently looking into the permanent mold process as a means of producing short runs in aluminum.

We would appreciate any assistance you could provide in the way of technical literature on permanent mold casting.—B.C.—Tooling Engineer.

We suggest this reader contact primary producers of aluminum ingot, most of whom have published excellent material on the casting of aluminum. Many of these references specifically cover the permanent mold casting of aluminum.

In addition, back issues of PMM will provide more material.—Ed.

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Tedious hand filling, messy spraying and sloppy applications of color . . . are eliminated when you use the ACROPRINTER®. We make a flexible die of ACROPRENE® to exactly match the cavity, depression and contour of your part or product, then set it in the ACROPRINTER® No. 301 or No. 401A . . . making your color filling operation a high production mechanical one that applies printing ink or enamel precisely and attractively.
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Model No. 301 is a hand operated machine adjustable for utmost perfection. Model No. 401A is the air-operated machine with that same precise touch and higher speed.

For FILLING or PRINTING, send a sketch, sample part or description with dimensions. Acromark Engineers will give you the full answer promptly, with illustrating data.

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"The Original Marking Specialists"

Circle No. 2 on Reader Service Card
PRECISION METAL MOLDING

Here's a real veteran of the Powder Metallurgy Industry. He's in his 10th year as a guide to buyers.

READERS . . .

Besides the thousands of reference items to help you find just the right vendor to supply you, we have an outstanding technical section. We promise you'll want to keep it for permanent reference if you design or buy powder metallurgy parts.

ADVERTISERS . . .

put your advertising in the high-readership climate created by April PMM

PRECISION METAL MOLDING's annual Powder Metallurgy Directory gets the call all year long when they're ready to buy powder metallurgy parts. Why? Because this issue is the only complete, authoritative directory of custom producers with all of the facts about the types of powder metallurgy parts they produce. And for the industry, this Directory lists the manufacturers of powders, presses, furnaces and other materials and supplies. Your advertising is exposed to your key customers and prospects wherever powder metallurgy parts are designed, specified, bought or produced.

Bonus Coverage at the MPIF Show

Advertisers in April PMM automatically cash in on special bonus circulation distribution at the annual Powder Metal Show April 24-26 in Cleveland. This means your product sales message will be seen by PMM's 23,000 readers who design, buy and produce powder metallurgy parts plus all those attending the Show. Since interest in powder metallurgy will be at its highest, let PMM's April Directory help you catch them when they're in a buying mood.

Don't miss this big issue if you buy (or sell):

CUSTOM FABRICATION:

- **Bearings (All metals)**
- **Cemented carbides**
- **Contact materials**
- **Cores**
  - Ferrites
  - High frequency
  - Low frequency
- **Electrical components**
  - Collector rings
  - Commutator segments
  - Pole pieces
  - Rotor segments
- **Friction materials**
- **Magnetic materials**
  - Hard-alnico type
  - Hard-other types
  - Soft
  - Iron nickel
  - Iron silicon
  - Other types
- **Structural parts (All metals)**
- **Filters (All metals)**

EQUIPMENT

- **Dies and tools**
- **Furnaces**
  - Electric
  - Fuel fired
- **Gas generators**
  - Anhydrous ammonia
  - Completely combusted gas
  - Partially combusted gas
  - Dissociated ammonia
  - Liquid hydrocarbon
- **Impregnation equipment**
- **Laboratory control & inspection equipment**
- **Lubricants (Die and powder)**
- **Mixers and blenders**
- **Presses**
  - Hydraulic
  - Mechanical
- **Pyrometric equipment**
- **Screening equipment**

POWDER

- **Aluminum**
- **Brass**
- **Copper**
- **Iron**
- **Lead**
- **Nickel**
- **Nickel silver**
- **Steel**
- **Tin**
- **Zinc**
- **Others**

CLOSING DATE FOR ADVERTISING: March 1, 1961

PRECISION METAL MOLDING
AN INDUSTRIAL PUBLISHING CORPORATION MAGAZINE

812 HURON ROAD, CLEVELAND 15, OHIO, SUperior 1-9620

OFFICES: NEW YORK • CHICAGO • LOS ANGELES • LONDON

a division of Adams-Millis Corp.

New Directions in Die Casting

More and more of the nation's leading companies are turning to Southern Die Casting and Engineering for the answers to their die casting problems. This is in keeping with the dynamic and progressive spirit of this vital new company . . . a company that has combined the most modern facilities, equipment and techniques, such as Vibrocast, to provide designing, engineering, die making and casting services that help produce better and stronger products at lower cost. For fast, dependable service for *your* die casting requirements, write today!

SOUTHERN DIE CASTING & ENGINEERING | *206 Albertson Rd., High Point, N. C.*

SALES REPRESENTATIVES: **Harold M. Eger & Associates,** 23705 Michigan Ave., Dearborn, Michigan • **Homer Lacock,** 468 Monroe Ave., Rochester 2, New York • **John W. Schorle Company,** Roger Building, Cincinnati 37, Ohio • **G. W. Smith,** Maple St., N.E., Atlanta, Georgia

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Make ALAN WOOD your IRON POWDER HEADQUARTERS

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A. W. Iron Powder can be your key to new design flexibility, reduced production costs and products of superior quality with closer tolerances. A.W. Iron Powder assures you of high purity, uniformity of size and composition . . . plus outstanding fabrication properties. Custom-mixed blends are readily produced to meet your most exacting specifications.

You're assured of prompt deliveries with A.W. Iron Powder, now being manufactured in volume in our 50-ton-a-day direct reduction plant. Behind these modern facilities are years of pilot plant operation, thorough testing and proving in customer applications.

And you're assured, too, of continuing quality and competent service. A.W. Iron Powder is backed by the full resources of Alan Wood Steel Company . . . extensive laboratory and research facilities . . . application engineering . . . and Customer Advisory Service to help make your investment more productive. Send today for technical data and application information . . . fill in the coupon below for samples and details.

ALAN WOOD STEEL COMPANY
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FOR MORE INFORMATION

Manager
Iron Powder Sales
Alan Wood Steel Company
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I am interested in Iron Powder for:
☐ Molding ☐ Friction ☐ Other
☐ Send literature
☐ Send sample

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COMPANY_____
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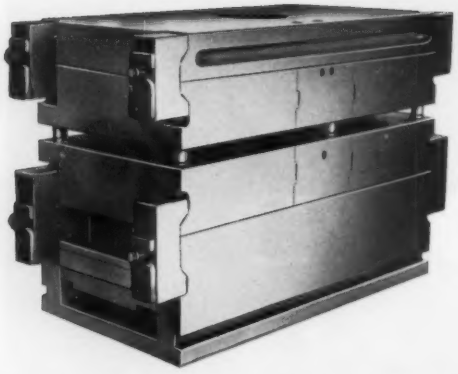
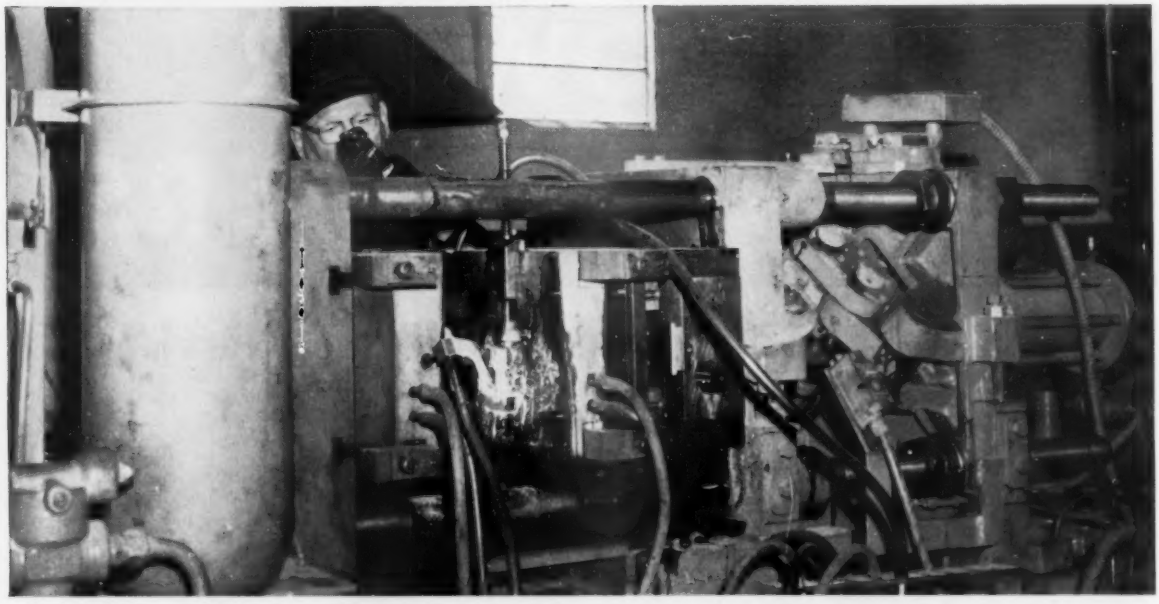
AMERICAN STEELMASTERS FOR 135 YEARS



SAVE ON SHORT RUN DIE CASTINGS!

CHANGE DIES IN MINUTES!

With D-M-E Standard Unit Dies for Zinc or Aluminum Die Casting



Cut Die Costs and Save Time with Stock Replacement Units

DIE CHANGES that normally take 3 to 5 hours are done in minutes with D-M-E's Standard Unit Dies for zinc or aluminum die casting.

Standard interchangeable Replacement Units are *in stock* now to reduce your die costs and shorten delivery schedules.

D-M-E's Standard Unit Die assembly offers these unique features for added savings in production time and maintenance:

Construction permits complete freedom on *three sides* of the cavity for placement of cores or cooling lines; six sturdy leader pins and bushings provide accurate alignment and trouble-free performance; and "quick change" wedge clamps for positive positioning of each plate.

Standard Replacement Units are quickly positioned in the Unit Die Holder by a precision T-slot in the mating edge of the plates; there is no interference with the cavity layout.

Whether you require rack and pinion or automatic "bumper-type" ejection, D-M-E has a Standard Unit Die to fit the machine.

D-M-E Unit Die Holders are available for Standard 10″ x 12″ or 12″ x 15″ Replacement Units.

Start saving *now* on your short-run die-casting jobs with D-M-E Standard Unit Dies.

SEVEN BRANCHES FOR FASTER SERVICE

Write **TODAY** for Complete Specifications

DETROIT MOLD ENGINEERING COMPANY

DME

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- D-M-E CORP., CLEVELAND: 502 Brookpark Rd.—DAYTON: 558 Leo St.
- D-M-E of CANADA, Inc., TORONTO, ONT.: 156 Norseman Ave.

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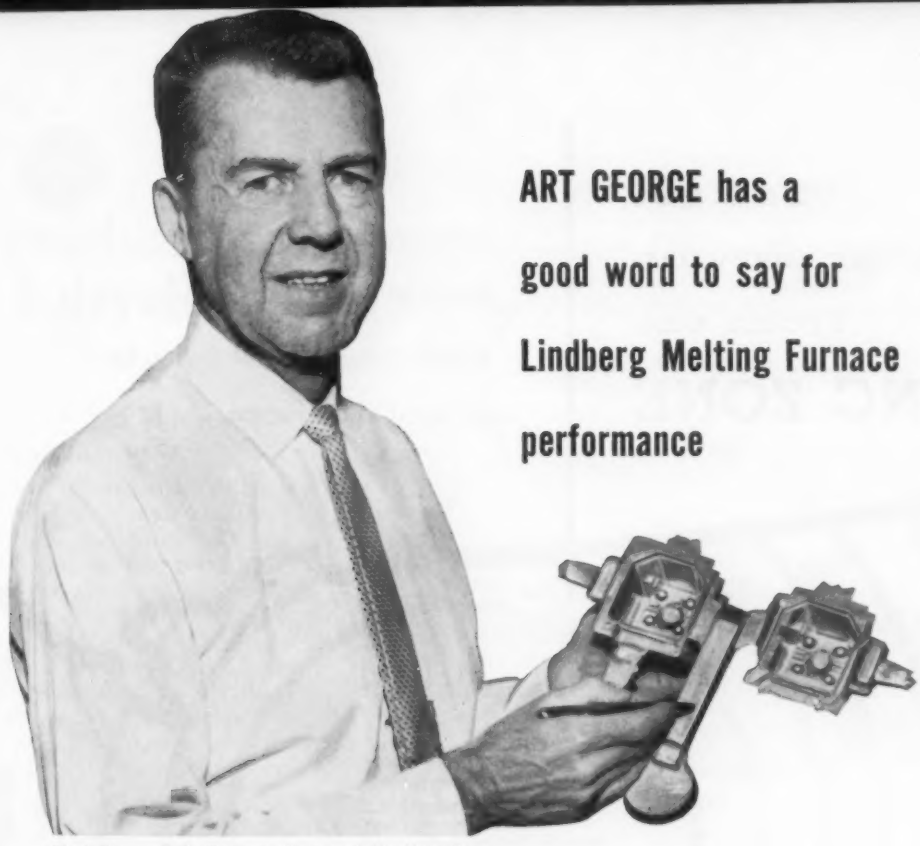


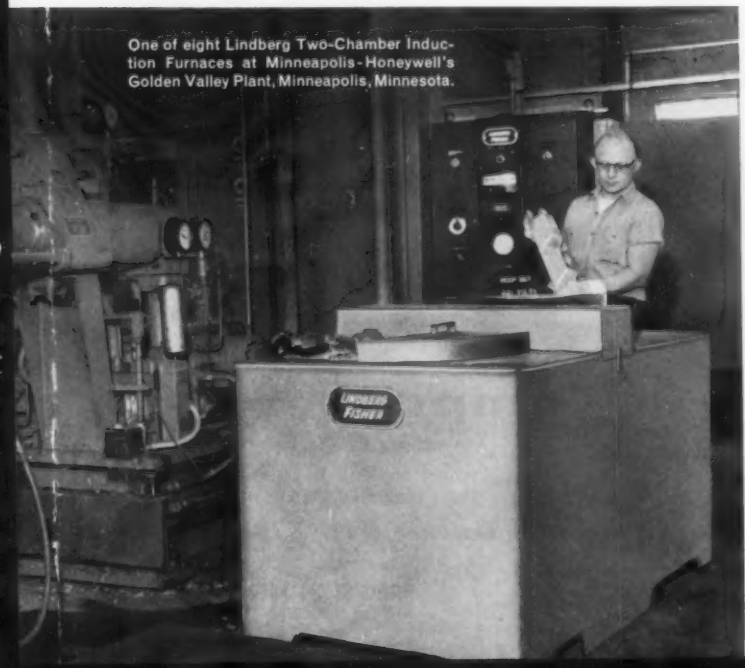
ART GEORGE has a good word to say for Lindberg Melting Furnace performance

QUOTE

Mr. Art George, Senior Production Engineer, Golden Valley Plant, Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.

"Our installation of eight* Lindberg-Fisher Two-Chamber Induction Melting and Holding Furnaces has given remarkable service for more than four years. In this period, with the help of a well executed Honeywell maintenance program, the installation has been unusually trouble-free. Only one of the eight furnaces has required relining over this long period. Handling more than 1,000,000 pounds of aluminum and zinc annually, the installation has unfailingly provided the consistently high quality of metal our precision instruments require."

**Altogether, 44 Lindberg Furnaces are in operation in various Honeywell plants.*



One of eight Lindberg Two-Chamber Induction Furnaces at Minneapolis-Honeywell's Golden Valley Plant, Minneapolis, Minnesota.

These eight Lindberg-Fisher Induction Furnaces melt and hold aluminum and zinc for die casting gas valve housings and other component parts. They are located at the die casting machines where ingot and scrap can be melted and held at the desired casting temperature in one convenient unit. Magnetic fluxing and stirring insures uniform temperatures and consistently clean metal.

In any production process where aluminum needs heat there is Lindberg equipment to apply it most economically and efficiently. Furnaces for melting and holding, casting stations, re-melting or heat treating are available in all capacities, electric or fuel fired. Get in touch with your Lindberg Field Engineer (see your classified phone book) or write us direct. Lindberg-Fisher Division, Lindberg Engineering Company, 2463 West Hubbard St., Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, South Africa, Spain, Switzerland and West Germany.

Circle No. 37 on Reader Service Card

LINDBERG heat for industry

You get
speedier service
from the

ZINC ZONE

Central location of
American Zinc plants assures
prompt deliveries of slab zinc to
any point in the nation.

HILLSBORO, ILL., PLANT
Prime Western, Brass Special, Intermediate, High Grade, Continuous Galvanizing Grades
MONSANTO, ILL., ELECTROLYTIC PLANT
Special High Grade, High Grade, Continuous Galvanizing Grades, Special Shapes
FORT SMITH, ARK., SMELTER
Prime Western, Brass Special
DUMAS, TEXAS, SMELTER
Prime Western, Brass Special, Continuous Galvanizing Grades

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
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Circle No. 10 on Reader Service Card

PMM

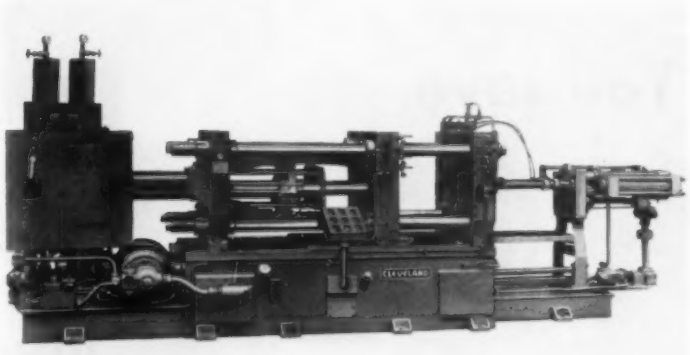
new products & developments

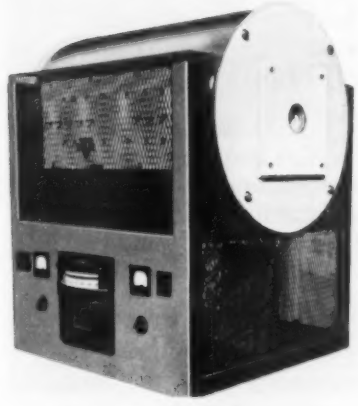
qualified readers can get complete details on these products. Use the reader service cards. Information presented here is the manufacturers' own assessment of their products.

DIE CASTING MACHINE

THE CLEVELAND AUTOMATIC MACHINE CO.—Major design changes have been incorporated in the Model 400 die casting machine. It has been strain gage tested for a locking pressure of 400 tons or better by the S.D.C.E. calibrated test ring method. The model 400 has 40″ x 40½″ (vert. and hor.) size die plates with 20″ x 24″ space between die bars. It will accommodate dies having 32″ maximum and 12″ minimum thickness. The hydraulic system is built to J.I.C. standards.

Circle No. 235 on Reader Service Card.





COMBUSTION FURNACE POWER CONTROL

DESPATCH OVEN CO.—The model SC-32 electric combustion tube furnace features a new type power control called the Thermionik Power System. With this system, thyratrons replace conventional contactors and saturable reactors, allowing greater accuracy of temperature control. Use of electronic tubes for control saves space, weight, and initial cost. The system is usable with any d.c. producing or proportioning slide wire control system. It may also be operated manually.

The furnace produces a maximum temperature of 2600°F and provides a 12″ uniform heat zone in a 2½″ O.D. ceramic tube. It is rated at 7 kw on 220/1/60 vacuum.

Heat dissipation is extremely low because the furnace body is constructed of high temperature refractory with exceptionally good insulating qualities.

Circle No. 236 on Reader Service Card

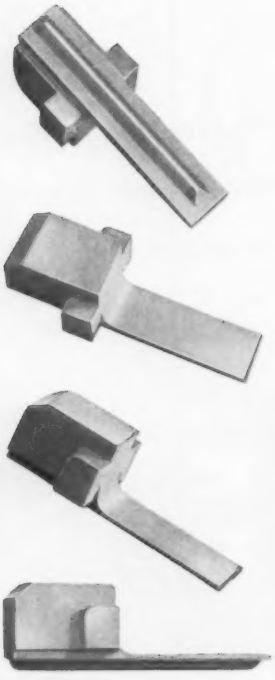
EXTRUSION BUFFER

ACME MFG. CO.—This reciprocating type, straight line buffing machine for finishing long extrusions is completely automatic.

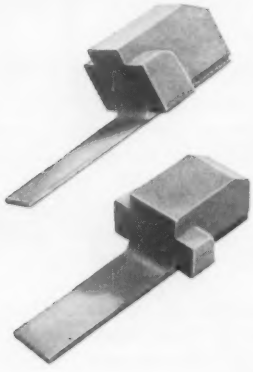
The unit consists of a conveyor on which a reciprocating work holding platen is mounted and a series of fully adjustable buffing lathes. The machine can be equipped with automatic buffing wheel wear compensators to maintain correct buffing pressures.

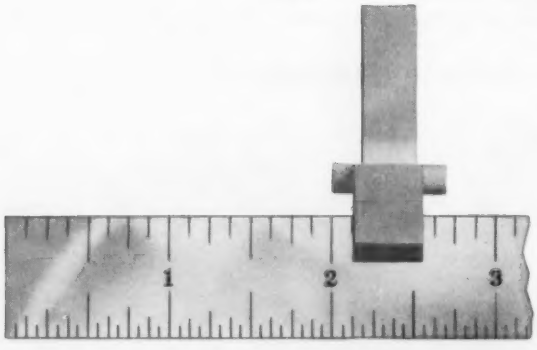
Circle No. 237 on Reader Service Card

more New Products on page 56



You save from every angle with V-R investment castings





Save machining time — V-R Investment Castings eliminate intricate machining operations on small, complex parts. Irregular shapes and fine detail on all surfaces are accurately and economically reproduced.

Save design time — V-R Investment Castings let you design for function without compromise for machining limitations. Multiple parts are often cast as single units. Uniform, close tolerances are held throughout the entire production quantity.

Save specifying time — V-R Investment Castings allow you to specify metals that are difficult, or even impossible, to machine. Thus, exceptional resistance to wear, heat and corrosion can be cast right into the part. Tantung, steel, beryllium copper, stainless steel or other special alloys are available to meet your requirements. Learn how you can save from every angle with V-R Investment Castings. Send sample or drawing, with specifications, today.

CREATING THE METALS THAT SHAPE THE FUTURE

VASCOLOY-RAMET

856 MARKET STREET • WAUKEGAN, ILLINOIS

I-817

Circle No. 56 on Reader Service Card

PMM

news of industry & associations

activities of people, companies & groups in the precision metal molding industries

5,000,000th TON OF ZINC PRODUCED AT THE COMINCO TRAIL PLANT

ZINC DEPARTMENT PERSONNEL and company officials pose with Cominco's 5,000,000th ton of refined zinc. From left to right are: Bruno Truant, D. D. Morris, assistant general manager of Cominco, T. H. Weldon, general superintendent, metallurgical division, J. D. Hartley, zinc department superintendent, and A. W. McDonald.

The Consolidated Mining and Smelting Company shipped its 5,000,000th ton of refined zinc. Shipment was made on Friday, December 9 from its plant at Trail, B.C., Canada. It marked a milestone in the company's history, which has been in operation for 54 years.

A special ceremony at the zinc plant was attended by plant personnel and company officials. The 5,000,000th ton was part of a shipment to National Hardware Specialties, Ltd. of Dresden, Ontario, a wholly-owned subsidiary engaged in zinc die casting.

Cominco began operations in 1916 and pioneered research in the development of a commercial process to produce electrolytic zinc. It began production operations in 1926 at a rated capacity of 30 tons per day. Today it has reached a capacity of 530 tons per day. One significant process improvement Cominco developed was the suspension roasting process.

ALUMINUM EXTRUDERS COUNCIL ELECTS NEW OFFICERS

The Aluminum Extruders Council closed their recent annual session in Washington, December 9, 1960. New officers were elected and the Executive Secretary, Walter Gebhart of the W. Gebhart Organization, was reappointed.

Mr. Lewis C. Laderer was elected as chairman of the board and president. He has over 20 years experience in the aluminum industry. He spent approximately 11 years with Alcoa in charge of their South Bend sales office after which he joined the Wells Aluminum Company as sales manager. Subsequent promotions elevated him to vice president and executive vice president, and one year ago he was elected president of Wells Aluminum Company.

Vice President is Roy Schoenhaar of the Jasco Aluminum Products Corporation. Harold Kapp of Air Master Corporation, Philadelphia, was elected a director.

In addition to the election of officers, a token was presented to Maurice Roberts, chairman of the technical committee, by Milton Smith, the retiring vice president.

more Industry News on page 24

SMITH ROBERTS

SCHOENHAAR LADERER

To make the BEST...
Begin with the
BEST CASTINGS!

Latrobe
Die
Casting Co.

Aluminum Alloy Castings

Zinc Alloy Castings

Tin and Lead Alloy Castings

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Tel: Portage 2-7663

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Tel: Amhurst 1164

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William Kranz
20001 West Lake Road
Tel: Edison 1-6888

DAYTON, OHIO
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363 West First St.
Tel: Baldwin 4-3523

DETROIT, MICHIGAN
J. R. Lemen, Jr.
1016 Fisher Bldg.
Tel: Trinity 3-5910

NEW ENGLAND
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Stamford, Conn.
Tel: Fireside 8-3985

PHILADELPHIA, PA.
Albert B. Reid
505 Wadsworth St.
Tel: Chestnut Hill 7-8833

Latrobe
Die
Casting Co.
Latrobe, Pennsylvania

Established
1918

Circle No. 34 on Reader Service Card

INDUSTRY NEWS

K. C. TUCKER PROMOTED

TUCKER

Ken C. Tucker, formerly manager of the food industries division of Oakite Products, Inc., has been named assistant sales manager of the firm. One of his major responsibilities in his new post will be the servicing of national accounts.

NEW V.P. AT LATROBE

Walter T. Haswell, Jr., works manager of Latrobe Steel Company for the past five years, has been named vice president in charge of production to succeed R. T. Eakin, who resigned.

CHANGES MADE AT CRUCIBLE STEEL COMPANY

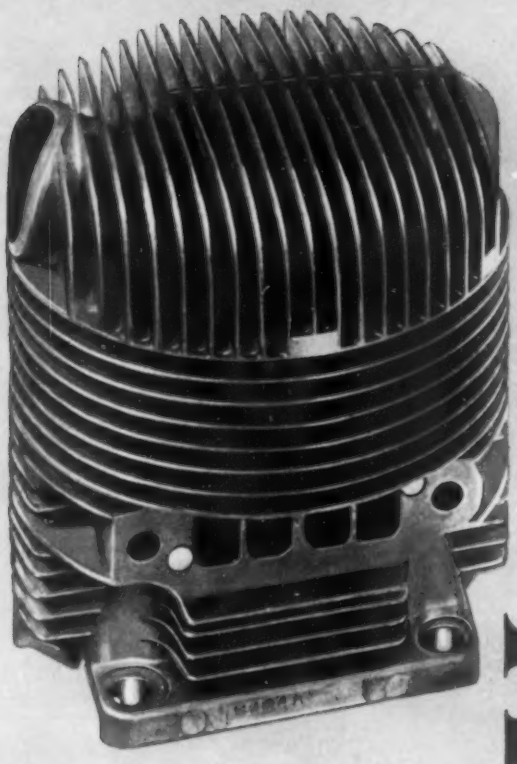
GREGG

MARCH

W. E. Gregg, formerly vice president—technology with Crucible Steel Company of America, has been appointed vice president—operations. He succeeds J. D. Dickerson who has been assigned new administrative responsibilities.

The company also announced that E. A. March, formerly director of metallurgy and technical development, becomes director of technology and will be responsible for the direction of the Technology Department.

more Industry News on page 26



Your most convenient,
most complete source:

FEDERATED ALUMINUM DIE-CASTING ALLOYS

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ASARCO

AMERICAN SMELTING AND REFINING COMPANY

FEDERATED METALS DIVISION

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This is a report that we continue to receive from our customers.

Standard melting kettles and machine pots direct from stock are available for all non-ferrous metals.

Special pots are made to your specifications.

We also furnish the following parts in Tiffin alloyd iron or alloyd steel:

- PLUNGERS
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All parts are especially engineered to give the best possible service in the die casting field.

OVER 50 YEARS EXPERIENCE in the manufacture of quality pots and die equipment.

FREE BROCHURE lists stock pots.

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INDUSTRY NEWS

FATH BECOMES DIRECTOR

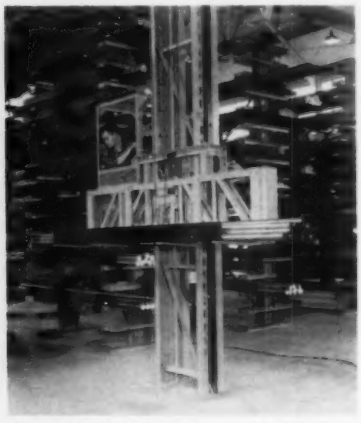
FATH

The promotion of William J. Fath to director of manufacturing has been announced by the H-P-M Division, Koehring Company. Fath came to H-P-M in 1954 as production control manager.

UNIVERSAL-CYCLOPS' SERVICE CENTERS EXPAND

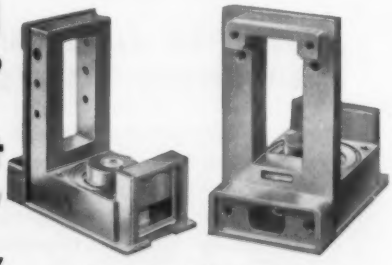
Universal-Cyclops Steel Corporation has expanded its specialty steel service center program to assure faster deliveries of stainless bar and wire, and tool and die steels.

Included in the firm's expansion of specialty steel service centers is a greatly enlarged and modernized facility at Bridgeville, Pa., plus new or enlarged facilities at Titusville, Pa., Cleveland, Detroit, New York and Worcester, Mass.



NEW METHODS of material handling assures faster delivery of steel.

Dimensional Accuracy? YES... but Other 'Specs' are Equally Exacting!



Two views of zinc die-cast body for Air Controlled Timing Valve.

Milwaukee operates under the Certified Zinc Plan of the American Die Casting Institute.

In addition to exacting dimensional tolerances, users of die castings often require other equally precise specifications to be met. For example, in the zinc die-cast body for the Air Controlled Timing Valve pictured, the following requirements were specified to insure successful assembly and functioning: absolute *solidity* and *high density* of the zinc alloy to prevent air leakage — along with a cast-in diaphragm surface absolutely smooth and free from imperfections; bottom of rectangular hole free from burrs; all plane surfaces flat and either parallel or square to one another.

Milwaukee has been meeting exacting requirements like these for more than a half century!

MILWAUKEE DIE CASTING COMPANY
4146 N. HOLTON STREET • MILWAUKEE 12, WISCONSIN
Established 1909

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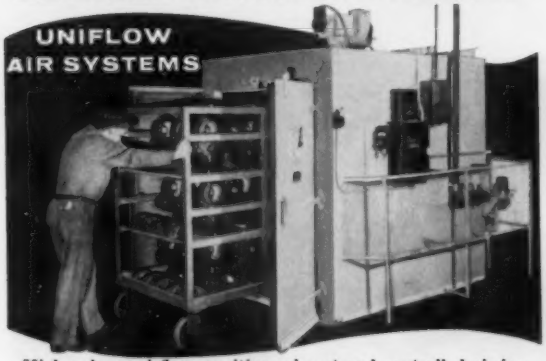
Production *PLUS* with DESPATCH OVENS

TEMPERATURES FOR APPLICATION TO 850° F. MAX.



High volume airflow, positive exhaust and controlled air intake in Despatch production ovens provide unexcelled operation over a wide range of applications. Recommended for chemical drying, curing insulating varnish on coils and stators, and finish-baking of japans, lacquers, enamels, and ceramics. Gas or electric heating are standard. *Despatch has been serving American industry for 58 years.*

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PRODUCTION
in
PRODUCT
FINISHING
C/M
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MACHINES
Permit production increases of hundreds to one over hand methods, and eliminate the need of experienced spray painters.
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Mechanical and air operated clamps and pressure FIXTURES for holding parts and masks.
C/M
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—20 years of "know-how" are at your disposal. Write for brochure or send prints or sample parts, giving production requirements and results desired.
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"C/M Quality Tools Produce Quality Products"

AN IMPORTANT ANNOUNCEMENT FROM ARNHOLD CERAMICS, INC.!

We are pleased to announce the formation of a new subsidiary company, AC COMPACTING PRESSES, INC., which will assume the functions formerly carried out by our DORST DIVISION. The new company will be responsible for the sales, distribution and engineering services of the DORST High-efficiency Automatic Compacting and Coining Presses.

We have taken this step in order to more efficiently serve our customers. The establishment of the DORST DIVISION as a subsidiary company will, we believe, enable us to provide expanded engineering, repair and maintenance services to the ceramic and powdered metals industries. At the same time, the new name more clearly reflects the major activities of the company which is the sales and servicing of a complete line of fully automatic mechanical compacting and coining presses. In addition to DORST equipment, the new company can furnish customers with tool drawings and tools in either tool steel or carbides.

Officers of the new company are: Henry H. Arnhold, President; Walter Gort, Vice-President for Engineering; H. H. Kundler, Vice-President for Sales and Helen Reid, Secretary.

ARNHOLD CERAMICS, INC., will continue to import and sell vital component parts for the electronics industry.

This change in our operation is an important step in the growth of this company. In the coming months we have every reason to believe that our customers and friends will more tangibly see the benefits and advantages of this change.

HANS ARNHOLD,
PRESIDENT AND CHAIRMAN OF THE BOARD
ARNHOLD CERAMICS, INC.
1 E. 57th Street • New York 22, N. Y.

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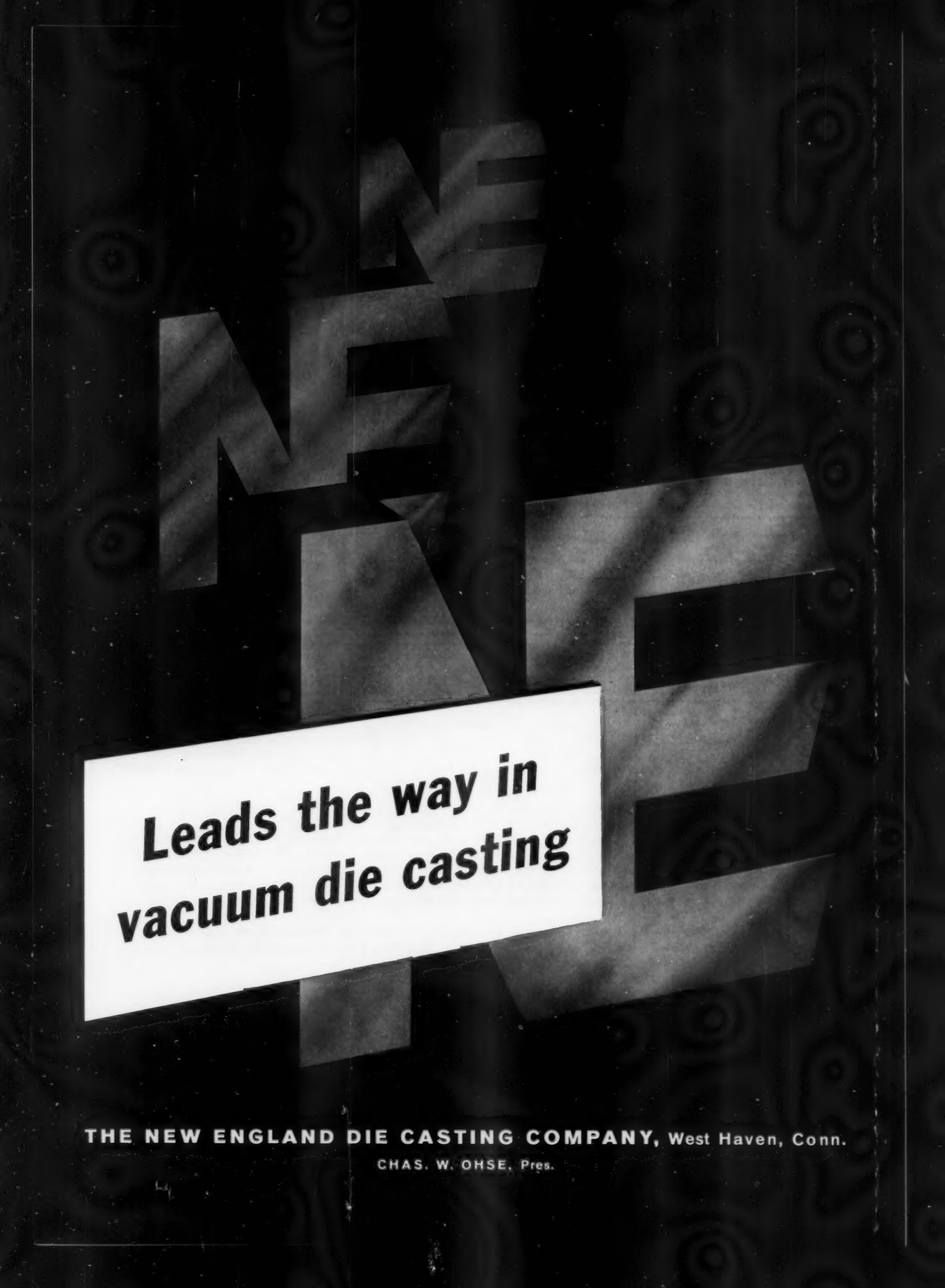


THE NEW ENGLAND DIE CASTING COMPANY, West Haven, Conn.

CHAS. W. OHSE, Pres.

NEW ZINC DIE CASTING ALLOY

... promises more flexible design, faster production

NOW REACHING THE MELTING POTS of die casters is a new zinc alloy developed by The New Jersey Zinc Co. Superior castability is claimed for the new Zamak 7 alloy which differs from popular Zamak 3 mainly in magnesium and nickel content.

Under development for many years, the alloy has drawn immediate reaction from designers who look to it for larger and more complex die castings with thinner walls and better surface.

For producers and buyers of die castings, the promise of faster production, lower casting temperature and fewer rejects offers attractive savings.

To test the claims for the new alloy on a production basis, many die casters are running it in cavities which have given them casting problems. As their experiences become known, PRECISION METAL MOLDING will report more fully on what the alloy means for designers, castings buyers and die casters. Meanwhile, listed below are the composition, properties and production characteristics reported by its developers.

Availability of a No. 7 alloy with the same composition and properties has also been announced by other zinc producers and alloyers, including American Smelting and Refining Co., the American Zinc, Lead and Smelting Co., and Apex Smelting Co. Many other companies who have not made public announcement are known to be producing the alloy.

Chief claim to fame of the new alloy is the low magnesium content. Older alloys have needed as much as 0.06% magnesium to counteract the effect of minor impurities. Now, with high purity zinc freely available this high magnesium content is no longer needed.

In addition to lowering the magnesium content to 0.020% maximum a small amount of nickel has been added to the alloy. The nickel has no adverse effect on castability and helps to insure proper life of the castings.

Currently, the new alloy is selling for ¼¢ per pound above the more popular Zamac 3. However, if the alloy lives up to early promise the slight increase in cost will be more than off-set by lower rejects, improved finishability, and the ability to cast larger parts.

A word of caution; extreme care must be exercised in the casting plant to avoid contamination if good casting life is to be secured.

SPECIFICATIONS FOR NO. 7 ALLOY

	INGOT	CASTING
Aluminum	3.9 to 4.3%	3.5 to 4.3%
Copper	.10 max.	.10 max.
Magnesium	.005 to .020	.005 to .020
Nickel	.005 to .020	.005 to .020
Lead	.0020 max.	.0030 max.
Cadmium	.0020 max.	.0020 max.
Tin	.0010 max.	.0010 max.
Iron	.050 max.	.075 max.
Zinc	Balance	Balance

WHAT TO EXPECT FROM NO. 7 ALLOY

MECHANICAL PROPERTIES

Tensile Strength (¼" min. section)	**41,000 psi**
Impact Strength (¼" x ¼" Charpy)	**40 ft. lbs.**
Brinell Hardness (500 Kg Load, 10 mm ball, 30 sec.)	**76**
Elongation (in 2")	**14%**

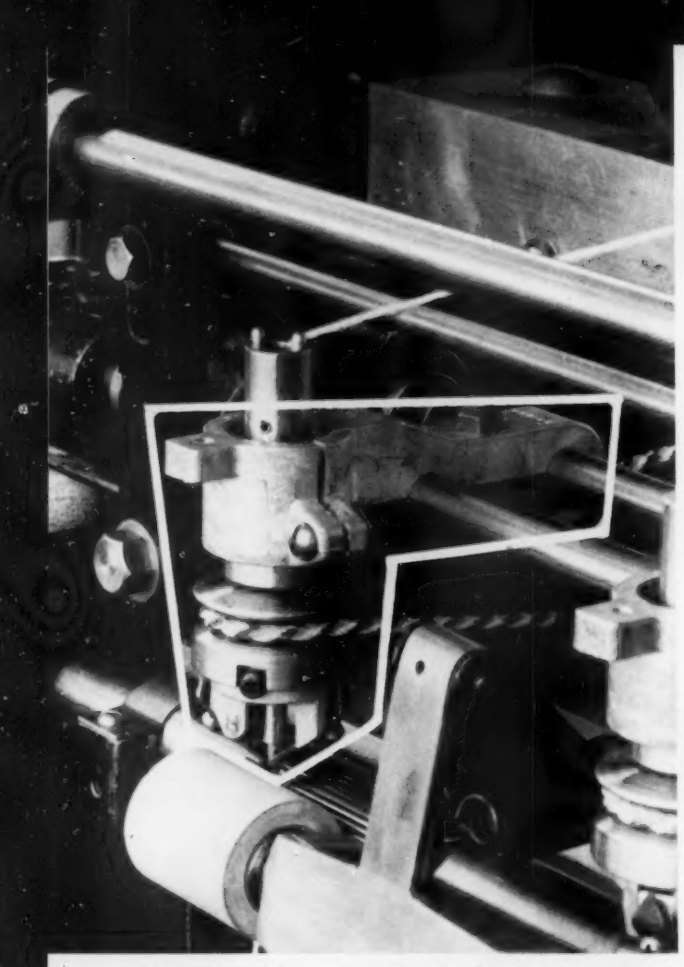
Properties listed are at room temperature as cast. Ten year indoor aging tests show that No. 7 has the same degree of permanence of properties and dimensional stability as No. 3.

PRODUCTION CHARACTERISTICS

According to the New Jersey Zinc Co., the improved castability of No. 7 will permit the designer and die caster to realize these benefits.

- Less critical die design (shorter lead time).
- Larger, more complex castings.
- Better surface finish.
- Thinner wall sections.
- Increased production speed.
- Fewer rejects.
- Lower pre-plating costs.
- Lower casting temperatures.

DESIGN FOR
DIE CASTINGS



ASSEMBLY of die cast parts (inside white box) on this textile spinning frame replaced cast iron parts without redesigning.

CLOSE-UP view of the die castings show the cap and bit assembly (top) and bracket (bottom).

IMPROVED PRODUCT DESIGN

. . . through vendor-buyer consultation

By HARRY BOLLMAN, *Sales Manager, The Newton-New Haven Co.*

DESIGNERS often can lower costs and improve their products by consulting with a die caster's customer service engineers. Unfortunately, a die caster's standing offer to assist in design is not often accepted in spite of the fact that it should be the first step in the design procedure.

How can a die caster help a product designer? His engineer can analyze all components of a product to see what, if any, parts can be made better or at lower cost by die casting them.

In addition, many benefits can result from his re-evaluating a part already designed as a die casting. Such parts sometimes do not take full advantage of the die casting process. In these cases redesign can again mean improved product function, better appearance, and lower costs.

CUTS COST WITHOUT REDESIGNING

For example, our representative analyzed all components in Davis & Furber Textile Machine Company's new Model H Spinning Frame. He noted that one assembly of cast iron parts, the twister tube bearing bracket and cap, would lend itself well to the die casting process. A study of the production operations showed that machining time could be reduced con-

siderably. The parts could be produced in identical configuration as a die casting except for several fillets and radii changes. This shows how a part being made by another process need not necessarily be redesigned in order to gain the advantages of die casting.

When the four parts in this assembly were replaced with four zinc die castings, two facing, four drilling, two milling, and one reaming operation were eliminated. The as-cast surface finish is smooth and does not have sharp corners on which fluff can catch. This is a prime requisite for parts used in textile machinery.

In addition, Davis and Furber also simplified inventory control and reduced considerably the time and expense involved in purchasing procedures. Since they no longer had to worry about dimensional variations due to machining, they achieved complete interchangeability of parts.

MAKES RIFLE ACCURATE

Another case where die castings helped improve a product is the Marlin 57-M repeating rifle, chambered for the .22 caliber Magnum cartridge. This rifle was being designed for "varmint" hunting. Woodchucks and ground hogs, for example, are difficult game to bag. It takes skillful shooting and a precision rifle to get them. That's why T. R. Robinson, Director of Research and Development at Marlin Firearms Co., wanted the 57-M to have the power, speed, and accuracy never before available in a .22 caliber rifle. Therefore, after he had determined the design, he called us in to assist him in developing the casting for the cartridge feeding mechanism.

In all previous Marlin guns the feed throat mechanism had been machined from stock, investment cast, or fabricated from sheet metal. Experience proved that for the 57-M the sheet metal parts would not be accurated enough, and the machined and investment cast parts would be too expensive.

Various manufacturing methods were evaluated, but the logical answer for this part was two zinc die castings. These would provide the required accuracy and quality at a cost of around 60% less than the nearest competitive manufacturing method. Marlin and the vendor's engineers cooperatively designed the two parts.

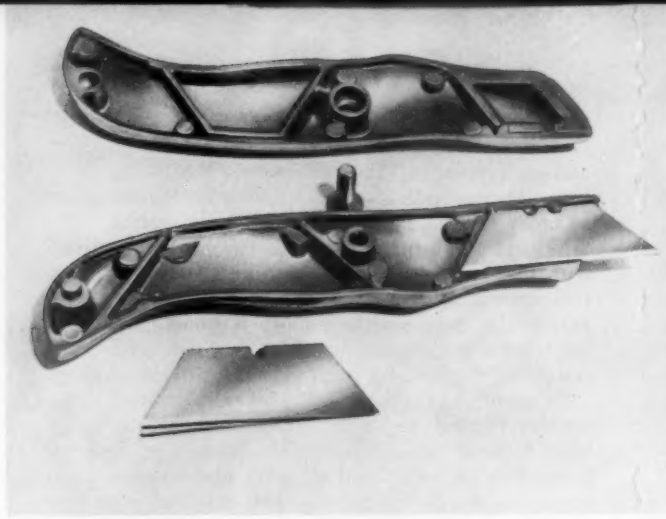
Here's how this design cooperation proceeded. First, our designers conferred with the Marlin engineers to determine the function and cost requirements for the part. Next, we submitted sketches for consideration.

After the Marlin engineers studied these sketches, they altered them slightly and made a drawing of the part so that we could submit a firm price quotation. The quotation was accepted and production samples were submitted to Marlin.

The design and consultation process was so complete and so successful that no tooling changes were necessary after pre-production samples were made and tested. Tools were merely heat treated and the job was in production.

CARTRIDGE FEEDING mechanism on the Marlin 57-M rifle is made from two zinc die castings.

VERSATILE CUTTING TOOL was especially designed to make the most efficient use of the human hand.



DIE CASTINGS permitted the cutting tool to have ample strength with sections thin enough to insure a light weight.

STANDS ROUGH TREATMENT

When Colt's Patent Firearms Manufacturing Co. was developing their Armalite AR-15 rifle, they originally intended to make the magazine cartridge follower of molded plastic. This rifle fires 750 rounds per minute and can puncture both sides of a steel combat helmet at 500 yards, yet performs with deadly accuracy as a sniper rifle. Plastics just didn't work in this application. They lacked strength and cracked in service. Our engineers were consulted. They provided an aluminum die casting that fitted the bill exactly. It was economical, light, yet strong enough to take a severe beating.

ECONOMICALLY PRODUCES COMPLEX CONTOURS

The Lamb Wedge-Lock handle knife is a versatile cutting tool consisting of a knife handle and replaceable blade. The handle was conceived by Thomas Lamb, an industrial designer specializing in hand-held items. His designs attempt to achieve the most efficient use of the human hand, taking into account bone and muscle structure, control, and fatigue. This results in a tool with both aesthetic appeal and an extremely high degree of manual efficiency.

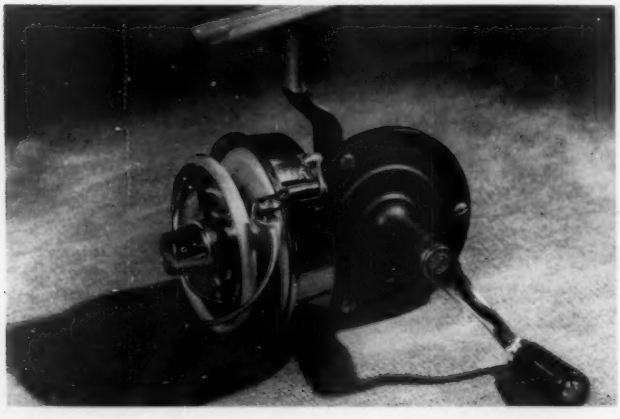
Lamb furnished us with the exterior shape. We, in turn, devised the structural design necessary for holding the cutting blade. This design provided the necessary sections for gripping the blade, extra blade storage recesses, and wall sections which were strong, but thin enough to secure the desired lightness. In addition, the design made the knife economical to produce and easy to assemble.

The time from conception of the product to production was slightly over a year.

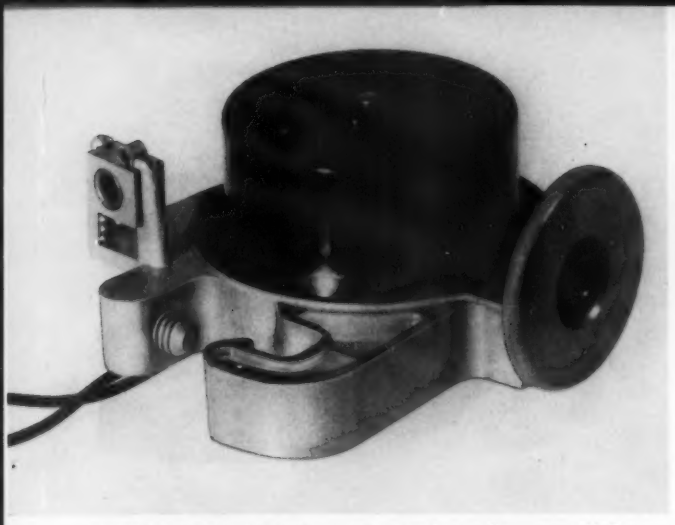
LONG-LIFE SPINNING REEL

For a fixed spool reel used for spinning, a type of fishing that is an outgrowth of fly fishing, die casting showed many advantages. The process reduced the

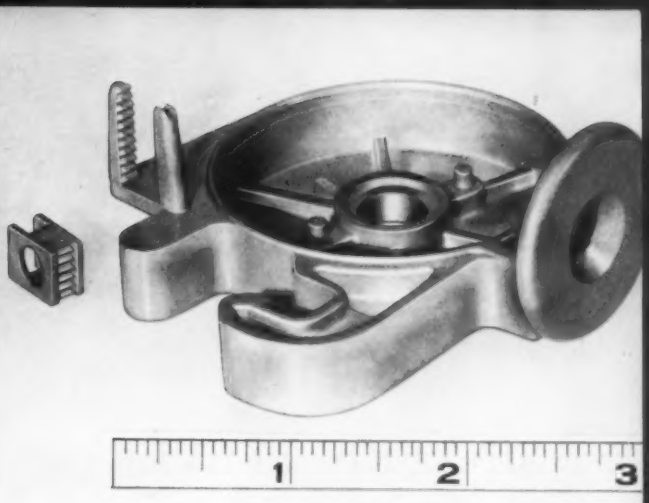
PRACTICALLY lifetime wear resistance of moving die cast parts is one of the features of this fixed spool spinning reel.



HIGH-QUALITY as-cast finish of the die castings used in the spinning reel eliminated many secondary operations.



TENSION CONTROL device for textile machinery could be produced economically only as die castings.



SMALL inlet thread guide for the tension control device is an aluminum die casting. The large base is cast in zinc.

weight and assembly time, streamlined production, and permitted practically lifetime wear resistance of the moving parts. The as-cast finish eliminated many secondary operations formerly required to complete and assemble the reel.

A specially formed main gear tooth is designed for quiet reeling. Its hardened steel shaft is cast as an insert to save assembly time.

PRECISION PARTS HOLD DIMENSIONS

Allied Controls manufactures a device to control the tension of thread and yarn in the production of textiles. The nature of the device is such that it could be produced economically only by die casting. A small, inlet thread guide is cast in an aluminum alloy. The larger base is a zinc die casting, designed to permit seven position adjustments of the thread guide in 1/16″ increments. The zinc base is smooth, preventing the snagging of yarn and the accumulation of fluff. In addition, it retains its strength, dimensions, and finish under the adverse temperature and humidity ordinarily found in textile mills.

BRIAR REPLACED BY ALUMINUM

The rabid pipe smoker will tell you that the best briars for pipe bowls come from centuries-old tree roots, and to get the grain just right in the bowl is an art dating back to the discovery of tobacco. But by making a pipe with a plastic mouthpiece, an aluminum die cast stem, and using briar for the bowl only, Aply, Tec Company produced a low priced pipe which smoked cool and had the other desirable qualities of the conventional briar pipes.

The die cast stem has twin cooling shafts running the length of the smoke channel. An adjusting device to regulate the draft of the bowl is cast right into the unit.

An attractive finish is achieved with vacuum plating. The lightweight pipes are now sold in gold, silver, and many pastel shades.

SMOKING PIPE has an aluminum die cast stem which provides the desirable features of the expensive, all-briar models.

COOLING SHAFTS and an adjustable draft device were designed into the aluminum die cast stem.

DESIGN FOR THE PMM PROCESSES

SINTERED LEVER IS AS DURABLE AS STEEL

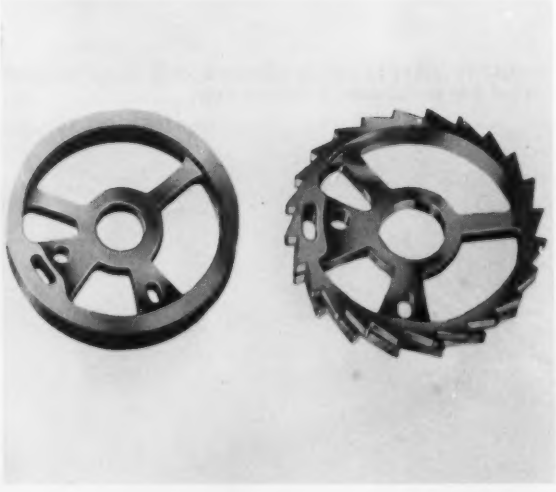
THE STEEL STRIKE lasted longer than the steel supply. It meant that the manufacturer who installed this transmission clutch lever in the final assembled part had to find a new way to produce other than machining from bar stock steel.

A sintering was recommended by engineers of Amplex Division of Chrysler Corp. and was accepted.

Designers easily adapted the part to the new method. Once a tool was made, large quantities of the lever were produced quickly and at lower costs than with the previous method. Machining was eliminated. Scrap was almost eliminated. The lever was used in the as-sintered condition.

How did it compare with steel parts when in operation? Excellent! Not a single failure was found during an extensive testing program.

CRITICAL TOLERANCES ARE HELD ON INVESTMENT CAST CLUTCH PLATES



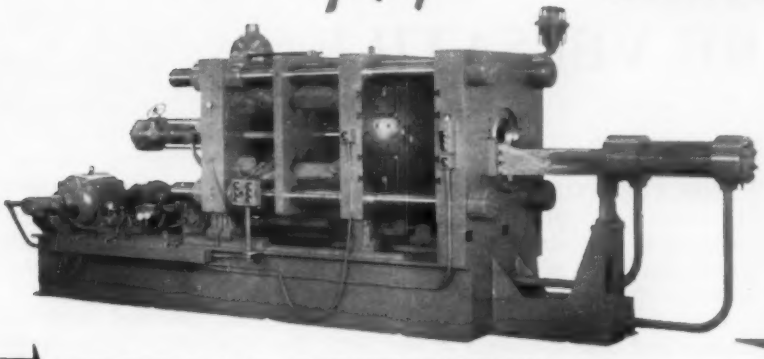
INVESTMENT CASTING of critical tolerance clutch-plates is as accurate as precision machining and has one other big labor saving advantage. Quantity production of parts meet the same close tolerances on each part which saves hours of machining time.

Engineered Precision Casting Company reports the plates were originally machined from bar stock. They felt the plates could not be made any other way and still meet the accurate specifications required. But because of the high machining costs, it was worthwhile trying investment casting.

Now only investment casting is used. Dimensions are more accurate and parts are interchangeable. Machining time is cut by six hours.

Successful changes by the company have been made on other products such as brackets, clutches, drivers, fingers, grippers, pawls, ratchets and toggles.

The STANDARD *Hydraulic* SYSTEM OF B & T DIE-CASTING MACHINES



1. MEETS J. I. C. SPECIFICATIONS!

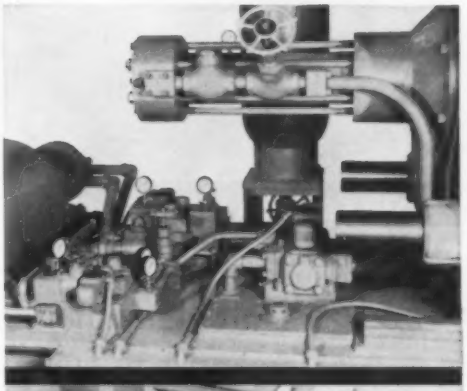
. . . a very important consideration in comparing both price and performance. For, this superior system of panel mounted hydraulics eliminates unsupported valves and threads between high pressure connections . . . permits very easy removal of valves for repair or replacement.

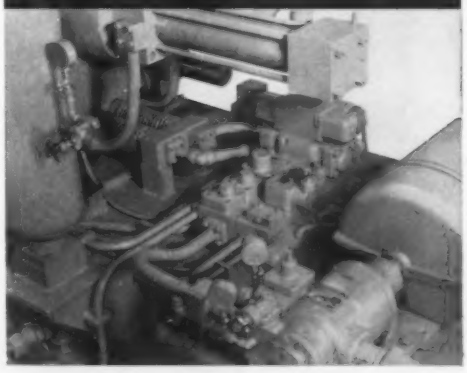
2. ELIMINATES LEAKAGE LOSSES!

Non-inflammable hydraulic oil is expensive and leakage losses are costly. With the B&T STANDARD system, loss of oil is negligible. Pipes have weldon fittings, socket welded to flanges which are bolted together with an "O" ring seal between mating surfaces to prevent leaks. Leaks cannot be caused by the normal hydraulic surges of a die casting machine because B&T uses heavy, rigid piping clamped firmly to the base at frequent intervals.

3. CUTS MAINTENANCE COSTS!

The B&T method of piping also saves time in disassembly, since it is only necessary to remove 4 bolts at each end of a pipe to free it from mating cylinders or parts.





The superior hydraulic system of B&T Die Casting machines is just one of several outstanding features that suggest the wisdom of thoroughly investigating B&T before buying any other. The line includes High-Pressure Cold-Chamber and Hot-Chamber Gooseneck types . . . in capacities of: 125, 150, 200, 300, 400, 500, 600, 700, 800 and 1,000 tons.

B&T GREENLEE DIE CASTING MACHINES

All of the engineering and manufacturing facilities of Greenlee Bros. & Co. are now available to B&T Machinery Co.

DIE CASTING RESEARCH

You are invited to use our Die Casting Research Center for experimentation and furtherance of die casting techniques.

B&T HYDRAULIC DIE CASTINGS TRIM PRESSES are exceedingly fast and efficient. Write for details.

B & T MACHINERY COMPANY

A DIVISION OF GREENLEE BROS. & CO.

202-218 West Eighth Street, Holland, Michigan

Phone EXport 2-8341

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ALUMINUM EXTRUSIONS ARE VERSATILE

THE VERSATILITY of aluminum extrusions can be demonstrated by the diversified applications in which they are being used. From small moldings to large structural members, designers are finding that extrusions often offer more efficient use of material, more functional components, better product appearance, and lower costs.

Complex cross-sectional configurations can be extruded with fine finishes and close tolerances at low costs. The light weight and corrosion resistance of aluminum enhance the special advantages offered by the extrusion process.

The case histories presented here show how the special features of aluminum extrusions are being used in a wide variety of applications.

POWER TRANSMISSION

Transformer housings perform better, are easier to fabricate

HOUSINGS for distribution transformers made from aluminum extrusions weigh less than one-third as much as the steel units they replace. This makes it easier, safer, and more economical to install the transformers on poles, and also results in a reduced weight load on the poles themselves.

The new housing provides more efficient transformer cooling because of aluminum's high thermal conductivity, and because the extrusion process permits the cooling fins to be an integral part of the housing—not merely welded to it. Welding each individual cooling fin on the steel housings was quite laborious.

Lifting lugs, hanger attachments, and core and coil supports are incorporated in the extrusion design.

Tests indicate that the new tanks will lower noise and magnetic losses. The rust-free aluminum will also achieve savings in painting and other maintenance.

The new housings are much easier to manufacture. Two semi-circle halves are extruded then automatically welded at great speeds to form a complete tube.

Reynolds Metals Co. Photo

Because of manufacturing, installation, shipping, and other savings, the cost of the aluminum transformers will be competitive with that of conventional steel-housed models. As larger housings are designed, the aluminum will show a marked price advantage.

MARINE

Aluminum replaces wood as sailboat mast

A NEW hollow aluminum extruded mast for racing class sailboats has been developed by Douglass & McLeod, Inc. It is dimensionally identical to the Sitka spruce mast previously used, but has greater strength, durability, and improved functional characteristics. Tests on a full rigged mast showed a strength factor twice that of conventional wooden masts. It meets all Thistle class specifications.

Developed with the assistance of Kaiser Aluminum, the mast is made from high strength 6063-T6 aluminum. It is pear-shaped with a 0.072" wall thickness and is 24½ feet long. The hollow portion is filled with Styrofoam so that the mast will float if the boat capsizes. The mast is anodized for improved appearance and corrosion resistance.

The vertical main sail groove is an integral part of the extrusion. Jib, spinnaker, and main sail halyards situated inside the mast are run up by winches built into the base. The completely rigged mast weighs 31½ lbs.

Kaiser Aluminum & Chemical Corp. Photo

COMMUNICATIONS

Extruded strip replaces part machined from bar stock

THE ROUND SURFACE of this metal strip makes a telephone switchboard look finished, eliminates rough edges and holds a panel in place. It's a clamp strip used on the Western Electric Co., Inc.'s central office telephone equipment.

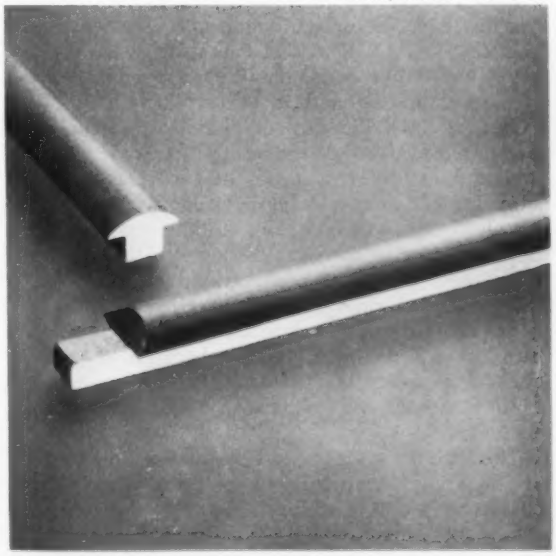
Large quantities of the clamp were required. It cost less to extrude and machine to final size than mill from bar stock.

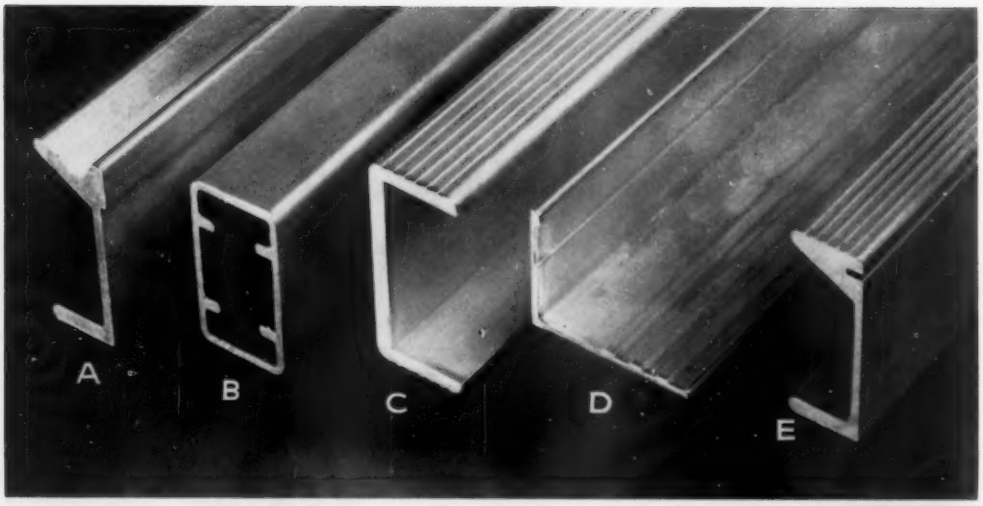
The shape lends itself well to the extrusion process. Major cost (and it is low) in making the extruded shape is the die. Once the finished bars are cut to length, the only requirement is to remove burrs and straddle mill the bevel stop.

This is a considerable saving in both time and production costs over fabricating the clamp from a rectangular piece of bar stock steel. Previous method involved having the bar cut to length, side cuts made, burrs removed, the bottom straddle milled, the radius milled, and lastly the bevel stops milled. Scrap metal loss was high.

The manufacturer saved $220 per thousand pieces over previous costs, by extruding this piece.

Courtesy Western Electric Co.





Photos Courtesy of, Crescent Metal Products, Inc.

SPECIAL EXTRUDED DESIGNS.

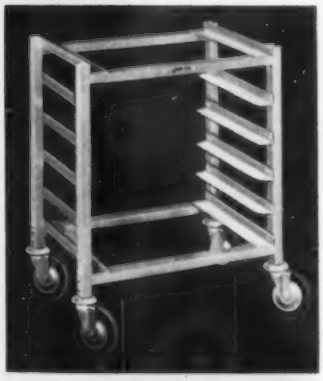
A. Designed to hold a hinge, this piece looks just as good used on the other side of the door frame without the hinge.

B. Post for the angle ledge rack. The ribs on the inner wall strengthen the section and hold a caster at the bottom.

C. Channel that joins the posts at the top and bottom. The grooves in the sides were added for appearance.

D. Angle ledge that supports the pans in the rack. The groove at the top enables the rack to accept larger pans. The ribs on the bottom reduce sliding friction.

E. Rear cabinet channel has a groove to hold the sheet aluminum which covers the back of the cabinet.



ANGLE LEDGE RACK such as this, made entirely from aluminum extrusions, is the basic frame for most of Crescent's Cres Cor food handling equipment.

MATERIALS HANDLING

Racks with "built-in" good looks cost less

"WE TRY to use extrusions everywhere we can," says Ray Emerick, design engineer at Crescent Metal Products, Inc. "We switched to extrusions because they lowered our costs, but they also improved the appearance and strength of our products."

Crescent uses 150 tons of aluminum extrusions a year to make a complete line of Cres Cor equipment for handling large quantities of food. Most of this equipment is built around a standard frame made entirely from extrusions. By adding extruded pan support angles or corrugated sheets to the sides, the frames become cabinets, racks, or carts.

The frames formerly were built from press formed aluminum. Labor costs dropped 45% when they were made from extrusions, largely because the major fabrication operation is to cut the extrusions to length. Material costs dropped 30% because there is less scrap.

"They are improving extrusions all the time," added Mr. Emerick. "You can get practically any shape that fits into a 16" circle." This helps the designers make parts which are both functional and attractive. For example, an extrusion designed to hold a hinge (figure A) looks just as good when used on the other side of the door frame without the hinge. So, one design does the job where ordinarily two would be needed.

The angle ledge racks illustrated above show the basic frame Crescent uses. Illustrations B, C and D above show the extrusions that go into the rack. All the extrusions are 6063 T-5 and T-6 aluminum. These are the fabrication steps for the rack:

- Cut the extrusions to length.
- Heli-arc weld two posts and an angle to form a subassembly. These are built in lots of 100 or 200, then stored.
- Weld crossmembers in place to make units of various widths as ordered.
- Install casters.
- Buff welds.

No other surface finishing is needed.

Crescent is considering ordering the extrusions to specified lengths. That would save most of the 40,000 lbs. of scrap created each year.

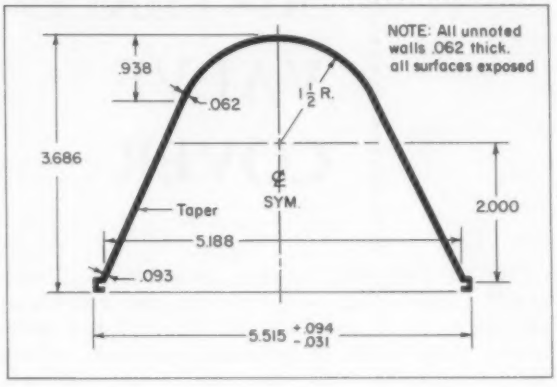
Extrusions permit more functional design

OPTICS

DESIGNERS of a reflector for indoor lighting equipment were able to get greater optical efficiency with an extrusion. To focus reflected light on the area where it is needed, with good efficiency, the reflector must be a parabola, or at least a parabolic approximation. They were able to closely approximate a parabolic curve with the shape of their reflector by using an extrusion. Also, the use of aluminum saved considerable weight. This makes the lighting fixtures easier and safer to install and maintain.

Use of an extrusion for this part not only provides the close tolerances necessary to keep the shape parabolic, but also provides sufficient structural rigidity. Formed sheet metal in this application would have required a lot of costly bracing.

Courtesy Precision Extrusions

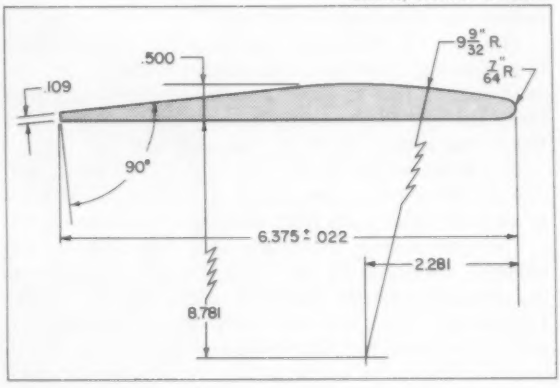


AERODYNAMICS

TO MOVE the greatest amount of air with the least amount of power, the blades for commercial exhaust fans were designed as unsymmetrical airfoils. Such airfoils produce less drag for a given amount of lift (or air movement in this case) than symmetrical airfoils. They produce much less drag than non-airfoil shapes.

However, the designers had to be careful. Unsymmetrical airfoils must be held to very close tolerances or they become inefficient. Also, the curved upper surface must have a fine finish. Die lines or misconfiguration would cause vibration and reduced efficiency. That's why extrusions were particularly well suited to this application. Also, the long, special-contour blades can be extruded at low costs.

Courtesy Precision Extrusions



STRUCTURES

ELECTRICAL air break switch bases are now made less expensively, lighter, and more rigid by using aluminum extrusions.

The design flexibility offered by the extrusion process permitted a design with superior base rigidity. This lets the bases do a better job of taking torsional loads caused by short circuits. It also allows installing switches with a greater overhang at the point of attachment. In addition, the corrosion resistance, maintenance free performance, and 70% less weight resulting from the new design make the extruded switch base a significant improvement. The new bases cost less to produce than conventional steel bases.

Designed and engineered by Reynolds Metals Co. Product Development Division, the bases are being used by I-T-E Circuit Breaker Co.

Reynolds Metals Co. Photo

cut costs,
improve appearance
with a . . .

SINTERED VALVE COVER

"WE'VE DECIDED to start using sinterings," says Mr. H. J. Lanfrankie, production manager of Mechanical Air Controls, Inc. "We are very cautious about having parts made by processes unfamiliar to us. However, careful study convinced us that sinterings will perform the way we want them to."

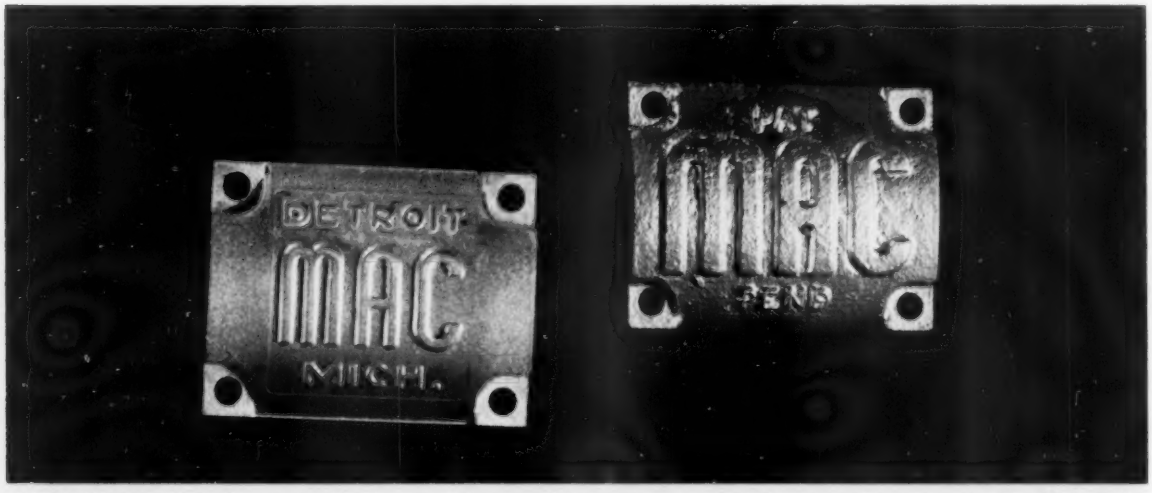
Mechanical Air Controls switched from an aluminum sand casting to an iron-carbon-copper sintering for the exhaust cover on their Series 300 solenoid-air operated valves. These valves control the air flow in pneumatic systems on automatic machinery.

The cost of the cover dropped 82% by switching to a sintering. Now the cover needs no machining. The sand casting had to have a surface ground and four holes drilled. Product appearance was improved by the better surface finish on the sintering.

The holes in the cover are held to ±0.003″, and outside dimensions are held to ±0.007″. Mueller Brass makes the parts from their alloy FC-10 powder.

The cost saving is not the only benefit from the change. "We formerly had to deal with two vendors—the foundry and the machine shop," explained Mr. Lanfrankie. "Now we have only one vendor to deal with. This saves handling time and expediting. That's nearly as important as the money we save on the part."

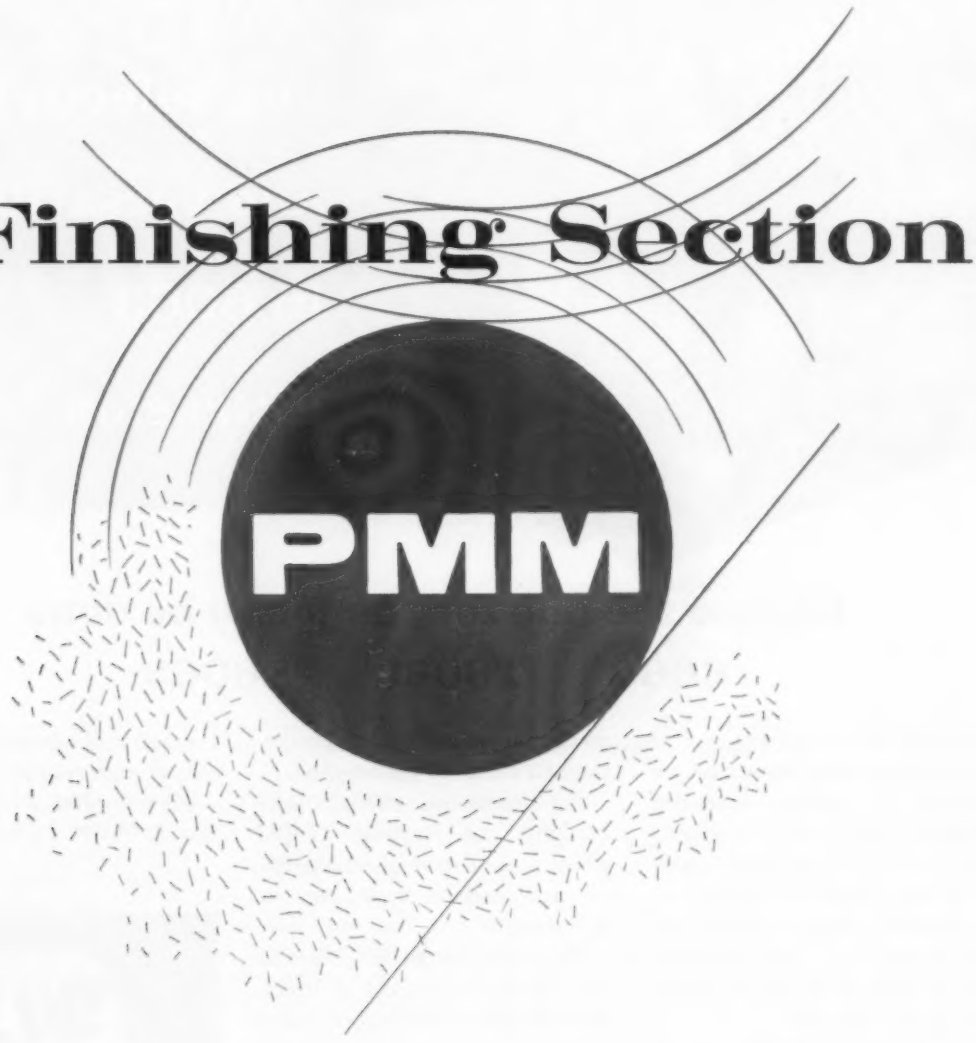
MAC SERIES 300 valve with new sintered exhaust cover in place. This type valve is used to control the air flow in pneumatic systems in automatic machinery.



POWDERED METAL exhaust cover (left) is much cleaner and better appearing than the previously used sand casting. The trademark on the sintered cover stands out and is readily legible from a distance.

The specialized finishing methods, equipment and materials used to machine, assemble, surface condition or surface coat precision metal molded parts are presented here. This includes all secondary operations which convert a raw casting to a finished product.

Finishing Section



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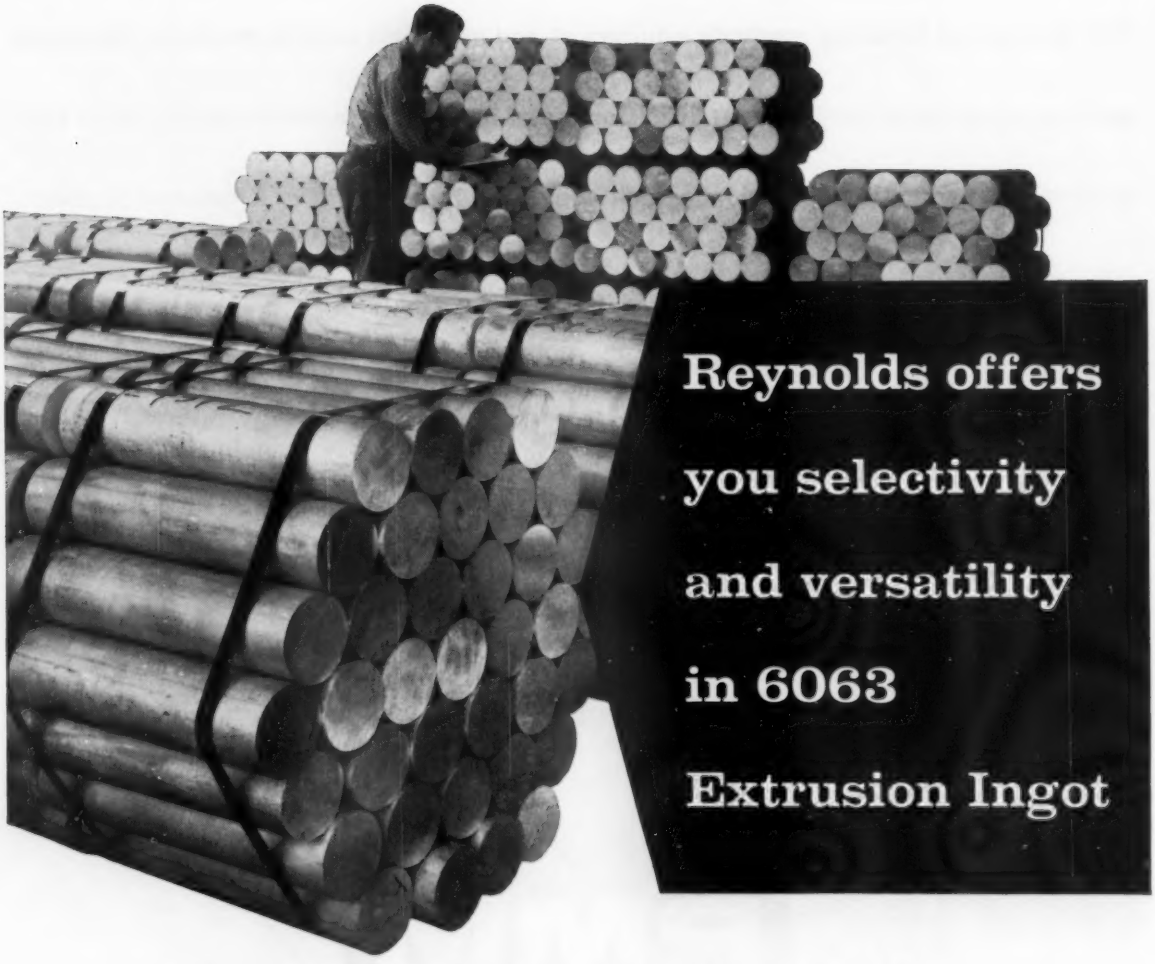
JEWELRY FINISH PLATING ON ZINC DIE CASTINGS .....Page 45



Reynolds offers you selectivity and versatility in 6063 Extrusion Ingot

Choose the one for the job to be done

6063 T6063 S6063

Reynolds offers refinements of 6063 homogeneous ingot that are designed to increase extrusion efficiency and product performance. Availability of specifications *S6063* and *T6063* as modifications within 6063 chemical limits further adapt the "all purpose" alloy to some of the specific problems of the extruder.

For T42 or T5 temper in hollow sections or thin solid sections use Reynolds S6063. It will give improved surface and extrude at higher speeds. It is not recommended when mechanical properties of T4 and T6 are required.

For maximum strength and hardness use Reynolds *T6063* where some degree of extrudability and surface finish can be sacrificed.

Reynolds regular 6063 is still the industry standard of excellence for the majority of extruded shapes.

Our complete Engineering Services and Metallurgical Departments are always at your service to provide more specific information and problem solutions on any area of extrusion production.

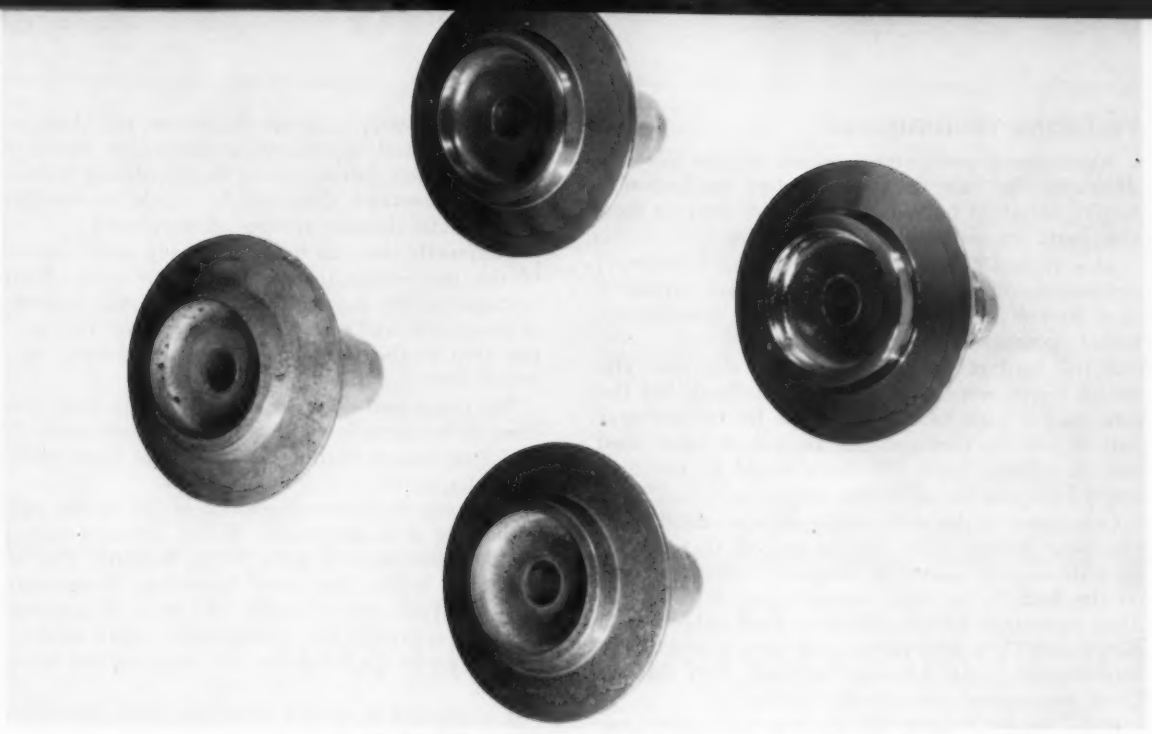
Reynolds Metals Company, P.O. Box 2346-FP, Richmond 18, Va.

REYNOLDS ALUMINUM

PRECISION METAL MOLDING

Watch Reynolds new TV show "Harrigan & Son", Fridays; also "All Star Golf", Saturdays—ABC-TV.

Circle No. 49 on Reader Service Card



WHAT'S THE DIFFERENCE in finishes? Knob on the far left is shown as-cast. A regular chip made the finish you see on the upper knob while a special chip was used on the lower. One on the far right was cut with a special chip, honed with a regular chip, and plated.

BARREL FINISHING DIE CASTINGS

. . using a newly developed compound

By MERLE MERWIN, *Technical Service Engineer, Minnesota Mining and Manufacturing Co.*

A FAR BROADER RANGE of zinc die castings are barrel finished more profitably today than was possible previously. The reason for this is a new finishing compound which was developed to hold better color in addition to imparting a high luster to zinc die castings finished by barrel methods.

This compound, developed by the Minnesota Mining and Manufacturing Co., also reduces the cutting effect of abrasive chips, so that they act more like burnishing media. Aided by the compound, fair burnishing can be obtained with most chips. In particular, the compound is for use with a cutting chip introduced in 1959 specifically for finishing zinc.

Although both the compound and the new chip were developed to solve problems encountered in finishing zinc die castings, they can be used to finish other metals as well. The chip is excellent for microfinishing many metals.

A NEED FOR BETTER MEDIA

For years, the problem of barrel finishing zinc die castings was that all commercial burnishing compounds darkened zinc, especially in long runs. Until 1959, a lightweight chip that would cut better than available chips also was sought, but holding better color was the greatest need.

One result of this need was the development of a zinc finishing chip, which cut moderately without gouging or peening the soft metal. This chip combines a lightweight bonding material with an extremely fine mesh abrasive. Despite emphasis on fine finishes, the chip is classified as a cutting medium of moderate speed. Because it is light, a larger than ordinary size chip may be used for finishing without danger of impingement. Fewer pounds of chips also are required to load a barrel.

Another result was the study that led to the perfection of the new compound. This compound is a dry, free flowing, soap-type. It produces and maintains excellent metal color on zinc, steel, most brasses, aluminum and copper. These metals come out of the barrel exceptionally light, bright and clean.

Although it is excellent for burnishing almost any alloy, it will darken high-silicon aluminums.

FINISHING TECHNIQUES

Experiments usually must be run on new alloys to determine the best techniques before production is begun. Standard procedures will work well on most zinc parts not now being barrel finished.

In a typical finishing operation in our laboratory, automobile dashboard switch knobs were processed in a 20-inch long by 20-inch diameter conventional barrel operated at 15 rpm.

A full load of various zinc pieces was run. The switch knobs were only a part of the load, but the ratio was 3 parts of size 4T chips by volume to 1 part of zinc die castings. The amount of water used was 2½ gallons. Some 350 knobs could be run in a single load in a barrel of this size.

One ounce of the new compound was added for a two hour honing cycle. At the end of that period, an additional 15 ounces of compound were scattered on the load. A six hour burnishing cycle followed. After separation, the pieces were washed in hot water, then dried. They were plated with copper, nickle and chromium to a thickness of approximately 0.001". Their appearance was entirely satisfactory.

If the brightest finish was wanted, we would have run the pieces only in regular tumbling shapes, but a small amount of impingement would have resulted because these are heavier chips. If we had run the load in the special zinc finishing shapes first to obtain any needed cutdown and used the regular chips for a short, high burnish run, the optimum brightness would have been obtained. This would have permitted appreciably thinner plating. With the special shapes alone, the finish was not quite as bright. But there was no impingement and the results were commercially acceptable.

In other words, regular chips give the brighter finish. The special chips for zinc provide more cutdown and do not impinge.

The method to be used depends on the piece to be finished, the results desired, and the cost. In all cases, the cost is less than buffing.

However, actual barrel finishing costs will vary, depending on which of the above methods is used. When both the regular and special chips are used in a double run, the barrel cost is higher, but the plating costs less. In a single run using only the new chips, the plating must be thicker for equal results.

Barrel honing prior to plating is efficient because the process can achieve a low micro-inch surface variation on almost any metal. Most zinc parts barrel finished and then plated have an eye appeal equal to their buffed counterparts. Heavier plating will be required in some cases to get top quality plate, but normal barrel finishing mass production savings still rule out the expense of labor for buffing.

COMPOUND CHARACTERISTICS

Used in maximum quantities, the new compound yields a heavy cushion of dense lather in a short time. Even in average amounts it produces heavy suds. There is some lubrication even when relatively small amounts are used.

Used in large quantities, the compound forms a jell which nearly supports the chips, but does not float them, and approaches a coating on the chip. This minimizes cutting during the burnishing process. In small quantities, there may be a little less cut than if a straight cleaning compound were used.

Frequently, we can use a relatively small amount of the new compound in a cutdown cycle. Then, without rinsing the load, we increase the quantity of compound, and get excellent burnishing. This saves one step in the finishing process and lowers compound costs.

The compound does not break down in long runs, even in moderately hard water (approximately 10 grains or less of hardness). It has not been tested in harder water.

The compound stops deposition of soil on the parts by holding it in suspension. It also prevents rusting or other corrosion of parts being finished. The alkalinity is higher than most burnishing compounds, with a pH of approximately 10.7 in a 1% solution.

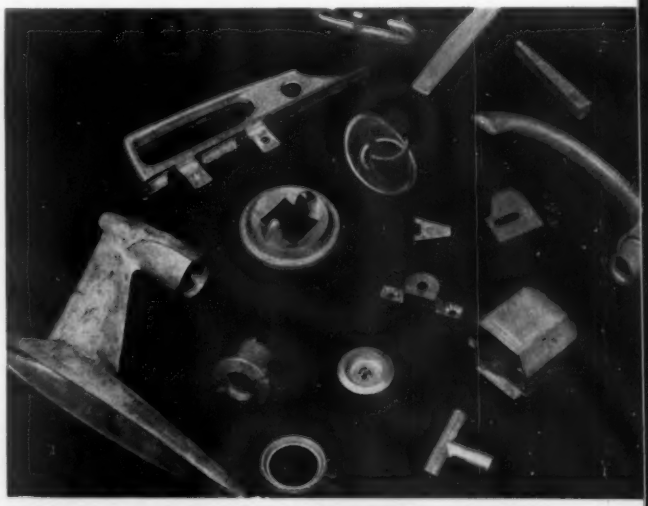
It is exceptionally free rinsing and contains no abrasive. It can be flushed down the drain without being treated.

It is effective in smaller quantities than most other compounds. Average use is 2 to 5 ounces per gallon of water. The maximum is 7 to 8 ounces per gallon. The amount is gauged by the load, chip, and amount of water used.

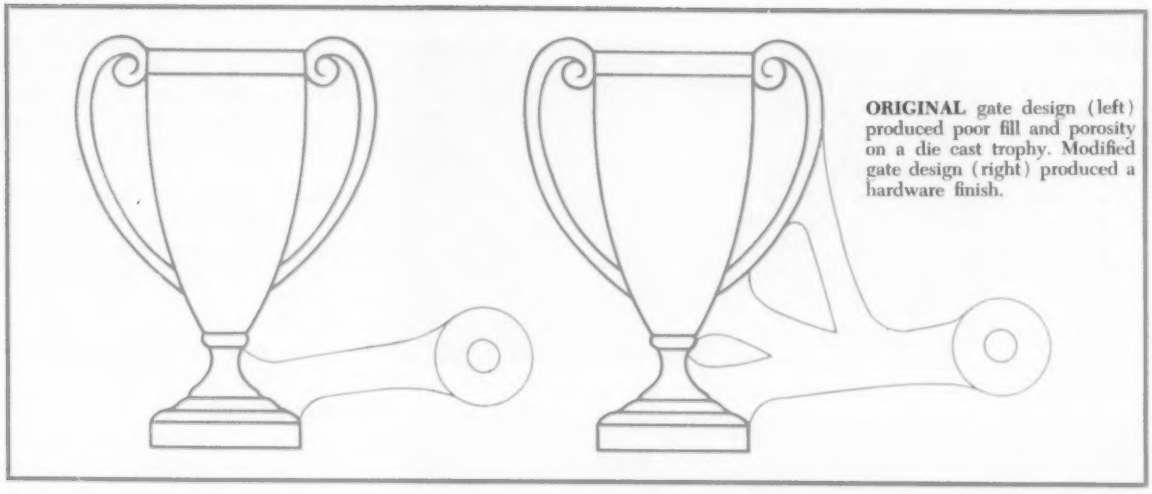
LIMITATIONS

Flat zinc surfaces, particularly larger ones, are difficult to barrel finish.

In instances where excessive flashing or other burrs are left on die castings, barrel finishing frequently will smooth, without removing them. In those cases, a fine abrasive belt can be used to remove the edging before the die casting is placed in the barrel. The saving in time over buffing still makes that procedure economical.



ZINC DIE CASTINGS such as these are suitable for barrel finishing with the new compound.



ORIGINAL gate design (left) produced poor fill and porosity on a die cast trophy. Modified gate design (right) produced a hardware finish.

JEWELRY FINISH PLATING ON ZINC DIE CASTINGS

By JOSSEL GERBER, *President, Albany-Chicago Co.*

DIE DESIGN and casting technique are among the most important factors in obtaining good plateable finishes on die castings. That's the conclusion we reached at Albany-Chicago Company. We found that we had much less trouble getting a jewelry finish on our die castings by keeping the end product in mind at every production step, from die design to rinsing.

Every production operation is critical and if not done perfectly can cause costly rejects. But none of the finishing operations can even be started if the zinc die casting is not perfect. We strive for a casting completely smooth and free of all defects, requiring only polishing on the parting line and light buffing before the plating operation.

CUSTOMER CONSULTATION

When we receive an experimental blueprint or model we have a brain-storming session with our die casting foreman, polishing foreman, mold maker and die designer. This is the time to eliminate future headaches of casting, polishing, plating and finishing. We submit our ideas to the customer, usually requesting generous tapers and fillets, avoidance of undercuts, good draft angles in cored holes, uniform wall sections and the use of commercial die casting tolerances, where possible.

When the customer submits his final approved blueprint we again check it and have our die cast mold design engineer make the complete set of prints showing gating, vents and knock out pins. This is submitted to the customer's engineering department for approval.

After final approval of the blueprint is received the actual production begins. Now we must make certain that the finished product will be satisfactory in every respect. To accomplish this goal, here are some of the rules we try to follow concerning die design, casting, trimming, polishing, and plating.

DIE DESIGN

- Use a single cavity die where finish and dimensional reproducibility are important. There are too many variables to watch with multi-cavity dies.
- Be careful with gate placement so that the slight blemish on the casting produced by the gate will not be in an area that will mar the plated finish.
- Keep secondary operations in mind so that parting lines are easy to trim. Die halves should mate well so that excess flash does not occur.
- Overflows must be carefully placed to correctly direct the metal flow.
- Make allowances for the thermal expansion of a die section which might affect the proper fit.
- Make sure there is ample draft on bosses opposite large flat areas, otherwise these bosses may stick when the part is ejected, causing a dimple on the flat surface. Although the dimple may be nearly impossible to find on an unplated surface, they become very noticeable when buffed and plated. If a dimple does form it can be eliminated by putting a base on the bottom of the boss.
- When grinding in the gate runners the grinding marks should be in the direction of the metal flow so as not to hinder the flow when the shot is made.

CASTING

There are narrow limits in the variables that must be controlled to produce good plateable castings. The variables to watch are:

- Die surface condition
- Cycle time
- Shot pressure
- Ejection pressure
- Clamping pressure
- Metal temperature
- Die temperature
- Bore of gooseneck
- Gate & vent openings
- Lubrication
- Water cooling
- Type of alloy

When running a new die, we set the variables according to our experience with a similar part. Then adjustments are made until a smooth solid casting is produced. We have found it best to take castings which look acceptable, buff and plate them, then check the quality of the finish. *If the castings are acceptable we record the variables listed above on special cards, so that the casting conditions can be duplicated when production begins.*

At each die set up it is necessary to check the squareness of the platens and the fit of link pin bushings. Also, each day the viscosity of the oil, condition of vane pumps, bottle pressure and leakage of hydraulic lines should be checked.

The die cast operator should be instructed to be quality minded, he should look at every casting. The moment he notices something wrong, he should stop and make corrections. Every employee should be an inspector, checking the parts from a previous operation before starting his own work.

Remember that the plater does not have a hole remover. Do everything you can to get a solid, perfect casting before the secondary operations.

It is not wise to use beeswax, sulfonated drawing oils, or compounds containing animal fats or stearates for die lubrication or any other lubrication on zinc castings. These can cause corrosion and, if not entirely removed, cause poor plating and painting adherence. A release agent should not be approved for use until it has been tested by plating a few parts to see if the regular cleaning cycle is able to completely remove it. A good test is to place the plated parts in an oven at 325°F to 350°F for 1 hour. If the release agent has not been removed the plate will blister, showing poor adherence.

The quench tank should be plastic, ceramic, wood or rubber lined. This will prevent the bi-metallic corrosion that is caused by using a metal tank. If the water is hard or leaves any staining on the cast parts it is best to let the parts air cool.

Care should be taken in handling to prevent castings from scratching each other. Trays or racks should be used to prevent scratching and nicking.

TRIMMING AND POLISHING

The trim die should cut as close to the casting as possible, but not close enough to scratch or deform the edge. The top of the die that kisses the critical face of the part should be covered with plastic to prevent scratching. Some parts such as heavy handles can be trimmed and burnished in the same die to eliminate the polishing operation.

Brush off the die after every stroke to keep it from closing on flash from the previous cycle.

Parts should be placed on trays after trimming to keep them from touching each other.

Do as little polishing and buffing as possible. A good casting requires only polishing of the parting line and a light buff before plating.

PLATING

After buffing we clean the castings in a trichlorethylene degreaser equipped with a pressure hose that can be directed to remove buffing compound packed into holes and recesses.

Parts with blind holes must be positioned on the plating racks at an angle so the solutions drain easily. Position the parts so that there are no areas of high current density. It is not necessary to use robber strips to keep current densities within acceptable limits if the parts are positioned correctly on the racks.

Next, the castings are cleaned cathodically and anodically. They are chemically clean and left in a bright condition.

After a water rinse the castings are dipped into an acid activator and plating conditioner. This is a mixture of dry acid salts, which are more effective and easier to use than raw diluted acid in carboys.

After another water rinse, the castings are copper plated in a semi-bright Rochelle-type copper bath for 15 minutes. Then they are rinsed again and plated in a bright nickel bath for 15 minutes. After another rinse they are placed in either chrome, gold, brass, or silver coloring baths.

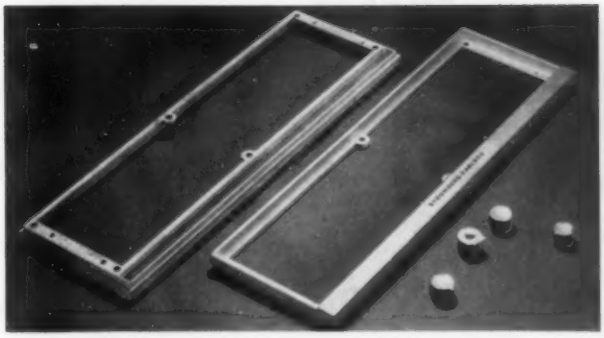
Finally, the finished part is carefully packed in individual cells in cartons.

The water that is used to cool our die casting machines is directed to the plating room and used in a series of three rinse tanks before going down the sewer.

Plating solutions require close chemical control to get good results and we keep a constant check on them. We also take special pains to keep the solutions clean by filtering.

DIE CASTINGS with gleaming finishes require little pre-plate treatment because of careful production and die design.

DIE CAST FOR SALES APPEAL



ESCUTCHEON and knobs for custom high-fidelity units.

APPEARANCE and performance—these are the main considerations when people buy custom high-fidelity components. And that's why the Stromberg-Carlson Division of General Dynamics Corporation uses die castings for the escutcheon and knobs on their stereo high-fidelity amplifiers and radio tuners.

The escutcheon is an ornamental frame to which the face plate is attached. As a zinc die casting, it has an excellent appearance and is easily finished.

From a performance standpoint, the die casting is strong, sturdy, and dependable, and will remain so. It will not chip or crack as some plastics do.

The escutcheon is cast in ASTM AG 40A (XXIII) by the Grand Rapids Die Casting Co. The bottom of the casting must be held flat to within 1/32". The only machining is to tap four blind holes that are cored. Recessed lettering is cast in. The back surface is belt sanded to assure a good fit.

The casting receives a simulated spun aluminum finish or a brass plate. Lettering is filled with a dull black paint.

DIE CAST KNOBS

All the switch and control knobs for the company's hi-fi line are die cast. These knobs meet much higher standards of appearance and performance than clear plastic vacuum plated knobs. There is no vacuum plate to eventually peel off. For quality and permanency, zinc die cast knobs were the choice.

The knobs are cast in a 6-cavity, highly polished die by the Kissel Die Casting Corp. They are used as-cast, except for trimming and minor finishing. They are given a brass finish or buffed to match the escutcheon.

NEW FROM SYNTRON

VIBRATORY BARREL FINISHING MACHINES

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Connect hose; flush out compound.

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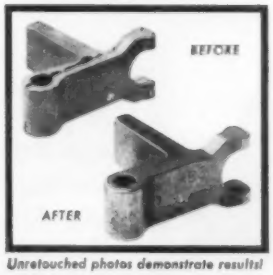
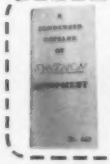


Unretouched photos demonstrate results!



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The secret—powerful Syntron electromagnetic vibratory drive! Parts and media constantly agitated by high speed, controlled directional vibrations. Hard-to-get-at places and shielded areas are worked more thoroughly. Handling minimized!

61BF3

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Parts Feeders

Transfer & Storage Parts Feeders

Bin Vibrators

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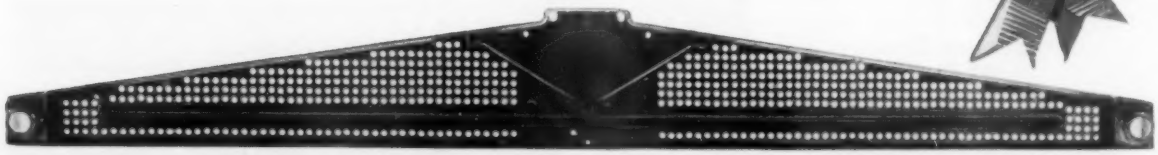
SALUTES

A&A die casting company

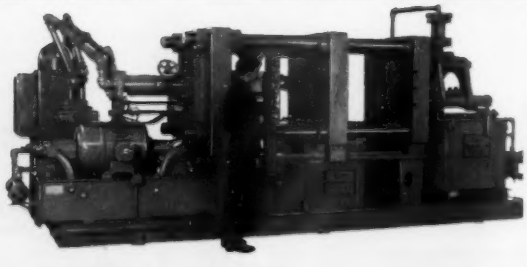
. . . top winner of the New Jersey Zinc Co.

"Zinc Die Casting of the Year" Award



A & A's $1,000-AWARD CASTING—THIS 6-LB. 32-INCH VACUUM CHAMBER FOR AMPEX DIGITAL TAPE HANDLER. CAST AT A SAVING OF 95% OVER PREVIOUS PRODUCTION METHOD.

CONGRATULATIONS TO A & A on their achievement of manufacturing this exceptional wave guide die casting. The casting, having an unprecedented 515 cored holes, was made to the most exacting requirements and tolerances. Two slots running almost the entire 32 inches of casting length are only .007 inches wide, and a flatness within .002 inches end to end is achieved as specified. A perfect cast finish is also a must, as the part is hard chrome plated for wear resistance.



Hydraulically operated plunger gooseneck model BH-600, with strain gage proven die locking pressure of 600 tons, produced the grand prize winner for A & A.

KUX IS PROUD, TOO—TO HAVE HELPED! To solve this and other difficult problems in precision die-casting, Victor Anderson and John Allen, founders of A & A Die Casting Company make almost exclusive use of many different models and sizes of Kux machines with their built-in engineering superiorities.

Write for full details of the 28 all-new KUX models illustrated in the latest KUX Die Casting Machine Catalog.

KUX MACHINE CO. • 6725 NORTH RIDGE • CHICAGO 26, ILLINOIS

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data offered in this month's ads *qualified readers may obtain any of these free reference materials by circling the numbers on the reader service cards*

1. **Solid Lubricants**—Acheson Colloids Co.—Technical Bulletin on its parting agents and mold coatings which help produce micro-smooth finishes on die castings.

5. **Iron Powder**—Alan Wood Steel Co.—Technical and Application information on custom-mixed blends and high-purity iron powders.

14. **Furnaces**—Brown Boveri Corp.—Literature describes its full range of furnaces, generators and accessories.

16. **Die Casting Machines**—Cleveland Automatic Machine Co.—Specifications on a complete line of die casting machines.

17. **Production Ovens**—Despatch Oven Co.—Bulletin on its complete line of production ovens for a wide range of finishing operations.

18. **Standard Unit Dies**—Detroit Mold Engineering Co.—Production information tells how to make die changes in minutes with unit dies.

20. **Die Casting**—Dollin Corp.—Facilities Brochure on its modern die casting plant for making zinc and aluminum castings.

23. **Lubricants**—Grafo Colloids Corp.—Applications chart for its colloidal graphites mixed with oil, water or alcohol dispersions.

24. **Zinc Die Castings**—Gries Reproducer Corp.—Bulletins describe tiny zinc parts made by automatic die casting methods.

27. **Investment Casting**—Hitchiner Mfg. Co.—Technical Information on the investment casting process it uses to provide greater freedom of design, shape and materials.

32. **Investment Casting**—Investment Casting Co.—Catalog on its cost cutting methods.

33. **Die Casting Machines**—Kux Machine Co.—Catalog describes a complete line of die casting machines.

35. **Heating Units**—Lepel High Freq. Labs., Inc.—Catalog on its line of induction heating equipment.

OFFERED FOR THE FIRST TIME . . .

The services and reference materials listed here are being offered for the first time in this issue by new PMM advertisers.

3. **Powder Metal**—Arnhold Ceramics—announces the addition of AC Compacting Presses, Inc. to handle sales and services on the Dorst automatic compacting and coining presses.

6. **Extrusions**—Aluminium Ltd. Sales, Inc.—List of independent aluminum extruders for any specific area.

8. **Powder Metals**—Easton Metal Powder Co.—Offers its line of spherical ferrous metal powders made by liquidous metallurgy.

21. **Investment Casting**—Filtros Inc.—Circular describes its porous ceramic plate method for coating investment and shell mold patterns.

25. **Sintering**—C. I. Hayes, Inc.—Bulletins on its sintering furnaces designed for close control, dependable operation on control research or full-scale operation.

40. **Fluid Purifiers**—Mayhew Products Co.—Brochure on fire-resistant hydraulic fluid reconditioners, portable and stationary, used on die casting machines.

54. **Palletainers**—Union Steel Products Co.—Information on palletainers used to ease die casting material handling problems, available on a 60-day memo billing basis.

59. **Abrasives**—Cratex Mfg. Co., Inc.—Catalog on complete line of its rubberized abrasives for micro-deburring, smoothing, cleaning and polishing.

60. **Fluxes**—Haviland Products Co.—Brochure on zinc and aluminum fluxes that separate four times more metal from dross.

61. **Vibratory Finishing**—Syntron Co.—Catalog on its complete line of compact electromagnetic, vibratory barrel finishing machines.

69. **Metal Powders**—Micro-Metals Corp.—Metallic and non-metallic powders are ground to specifications.

71. **Investment Casting**—Casting Engineers Div.—Technical Bulletin tells how it can cast parts to tolerances of ± 0.001".

36. **Die Casting Machines**—Lester-Phoenix Inc.—Illustrated Bulletin covers its broad range of die casting machines.

41. **Sinterings—Merriman Bros., Inc.**—Technical Bulletin and Catalog on highest quality, dimensionally accurate sinterings.

44. **Powdered Metal**—New Jersey Zinc Co.—Booklet describes how to design for pressed brass and nickel-silver powdered metal parts.

46. **Pinions and Racks**—Peerless Gear & Machine Co.—Catalog describes its pinions and racks for users of die casting molds and permanent molds.

47. **Die Castings**—Premier Die Casting Co.—Facilities Brochure describes its complete die casting services, including vacuum die casting.

48. **Sinterings**—Reese Metal Products Corp.—16-page booklet tells how to cut precision parts costs with the Remet powdered metal process.

50. **Pattern Wax**—Alex. Saunders & Co., Inc.—Descriptive Literature on its blue wax for patterns, also Sherwood injection presses for large patterns.

52. **Pots**—Tiffin Foundry, Inc.—Brochure lists its complete line of stock pots.

58. **Finishing**—Conforming Matrix Corp.—Brochure on its line of automatic painting machines.

70. **Trim Presses**—Parker-Hannifin Corp.—Bulletin describes high speed hydraulic trimming presses.

SHOCK TREATMENT!

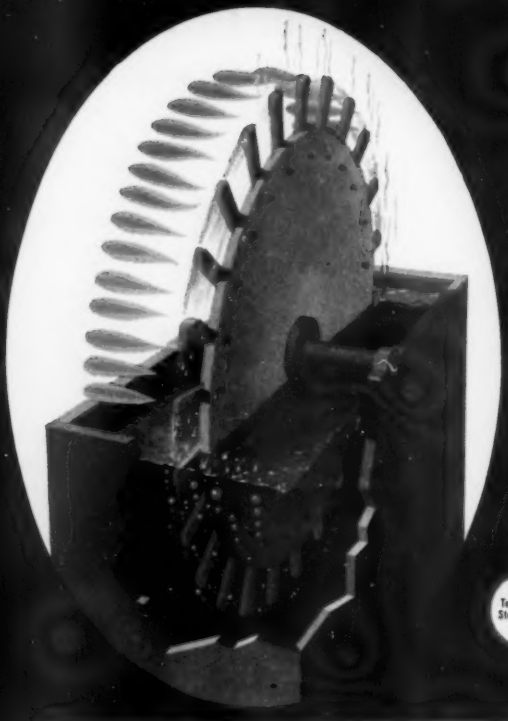
VACUUM-DEGASSED

THERMOLD® AV

DIE CASTING DIE STEEL

SHRUGS OFF THERMAL SHOCK

IN HEAT CHECKING TEST



Test samples heated to 1200° F. in this revolving fixture and repeatedly quenched in 70° F. water

•

A full cycle every 50 seconds

Here's proof of vacuum-degassed Thermold AV's improved resistance to thermal shock. Compare the results between vacuum-degassed and regular electric arc air melted samples shown at right. Note the superior resistance to heat checking evidenced in the vacuum-degassed test pieces. It's easy to see why Universal-Cyclops Thermold AV now assures you of longer die life, longer runs, finer finish . . . *more profitable production.*

Vacuum-degassed Thermold AV is a cleaner steel. Greater internal soundness (Reflectoscope proved), higher polishing quality, and greater resistance to fatigue and heat failure have made it today's ultimate in die casting die steels.

Call your nearest Universal-Cyclops Service Center for more information or for fast, off-the-shelf delivery. It's available in a complete range of sizes . . . including giant 4-ton blocks.

UNIVERSAL CYCLOPS

UC STEEL

STEEL CORPORATION

EXECUTIVE OFFICES: BRIDGEVILLE, PA.

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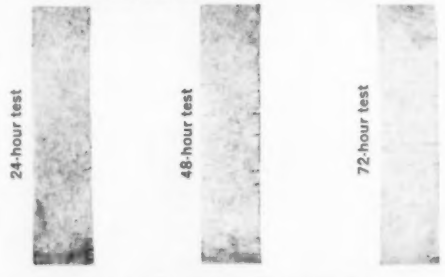
EXAMINE THESE TEST SAMPLES!

All samples shown were made from the same heat, part of which was vacuum-degassed, and the balance cast in normal fashion in air.

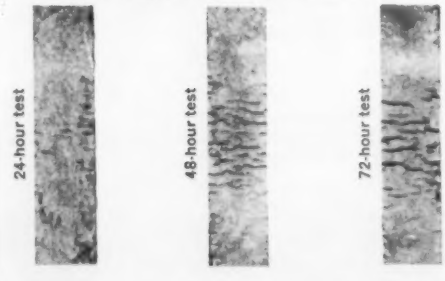
✓ **VACUUM-DEGASSED ARC MELTED SAMPLES**

Note that the samples were hardly affected by the thermal shock test.



✓ **NORMAL ARC MELTED SAMPLES**

Note the typical heat checked surface of these samples, subjected to the same test.



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useful literature, *qualified readers may obtain any of these technical publications* catalogs, manuals *by circling the numbers on the reader service cards.*

PROCESSES

145 **Impact Extrusions**—STEEL INDUSTRIES, INC.—Design Brochure lists technical and engineering data for designing impact extrusions.

146 **Mangesium Alloys**—THE DOW METAL PRODUCTS CO.—Technical reprint of a study on low temperature properties of the newer magnesium alloy compositions.

147 **Shell Mold Castings**—ESCO CORP.—Technical Brochure lists physical properties and engineering data for shell mold casting.

148 **Castings**—ALLOY CASTING INSTITUTE—8-page article tells how to buy high alloy castings.

149 **Investment Casting**—WAIMET ALLOYS CO.—20-page Report on the characteristics, metallurgy, markets, and future trends of the investment casting industry.

150 **Die Castings**—HENNING BROS. & SMITH, INC.—36-page Reference Book tells how to produce sound zinc alloy die castings.

151 **Extrusions**—AMPCO METAL, INC.—4-page Bulletin lists 22 new stock sizes of rectangular extruded copper base alloys, includes physical properties, lengths, and tolerances.

MATERIALS & EQUIPMENT

156 **Die Cast Wing Nuts**—GRIES REPRODUCER CORP.—Stock List of special wing nuts to solve fastener and other problems, includes engineering data.

172 **Angle Measurement**—ENGIS EQUIPMENT CO.—Data Sheet lists over 20 direct angle and circle measuring instruments, lists sensitivities.

173 **Vacuum Ovens**—TEMPERATURE ENGINEERING CORP.—30-page Catalog describes vacuum ovens, diffused "Aer-Heat" chambers, radiant ovens, controlled atmosphere enclosures, and other vacuum and heating equipment.

174 **Temperature Controls**—BURLING INSTRUMENT CO.—Catalog shows a complete line of differential expansion type temperature controls.

175 **Steel Alloys**—WAIMET ALLOYS CO.—Stock List for a line of alloy steels for investment casting.

176 **pH Meter**—BECKMAN INSTRUMENTS—Bulletin describes a line-operated drift-free unit for making precise pH or millivolt measurements.

177 **Technical Films**—MODERN TALKING PICTURE SERVICE, INC.—Catalog lists technical and industrial movies available for free loan.

178 **Hydraulic Components**—RUCKER CO.—8-page Catalog lists a line of hydraulic and pneumatic controls and equipment.

179 **Vacuum Arc Furnace**—NRC EQUIPMENT CORP.—Information on a versatile vacuum arc furnace which can be used interchangeably for button melting or the production of small ingots.

180 **Air Cylinders**—HANNIFIN CO.—4-page Bulletin has complete engineering data and specifications on the new 200 psi maximum Series "S" midget air cylinder. Both universal and nose mounting models in several bore sizes are described.

181 **Hydraulic Systems**—VICKERS INC.—6-page Bulletin on the application of packaged hydraulic systems to solve a wide range of process control problems.

182 **Constant Voltage Supply**—WEST INSTRUMENT CORP.—Bulletin describes a constant voltage supply which provides precise regulation.

183 **Extrusion & Die Casting Dies**—MANCO PRODUCTS INC.—4-page Brochure shows how to save money by casting tool steels for extrusion and die casting dies.

184 **High-Speed Steel**—BRAEBURN ALLOY STEEL CORP.—Technical Bulletin on a new high speed steel for machining high temperature alloys and high strength steels.

192 **Vacuum Furnaces**—LINDBERG ENGINEERING CO.—8-page Bulletin describes a complete line of vacuum furnaces, shows typical applications.

193 **Melting & Holding Furnace**—SUNBEAM EQUIPMENT CORP.—Technical Brochure lists specifications and design features for an aluminum melting and holding furnace.

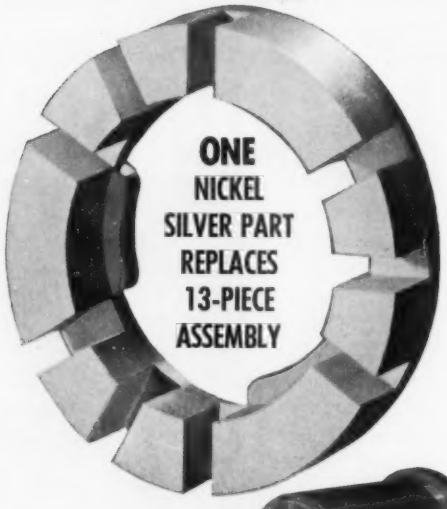
194 **Inspection**—BUDDS INSTRUMENT DIV.—Brochure shows a unit which simultaneously detects subsurface defects and dimensional variations in metals.

195 **Furnaces**—ASSOCIATED FOUNDRY SERVICES, INC.—Brochure describes a line of versatile melting and holding furnaces that may cut your melting costs in half.

196 **Power Tools**—DELTA POWER TOOL DIV.—92-page Catalog describes a complete line of industrial power tools and accessories.

continued on next page

METAL POWDERS CUT COSTS $1.97 per piece



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TOTAL COST WAS $2.07

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USEFUL LITERATURE

197 **Flux Applicator**—FOUNDRY SERVICES, INC.—Information on a compact, portable device for applying fluxes to reverberatory melting furnaces.

198 **Special Steels**—MARATHON SPECIALTY STEELS, INC.—8-page Brochure on high speed, hot work, and other special steels.

199 **Annealing Furnace**—WALTZ FURNACE CO.—Complete data on a continuous, gas-fired furnace with a wheel driven conveyor belt for production line annealing.

200 **Lubricants**—ACHESON COLLOIDS CO.—External house organ tells how the use of the proper lubricant produces exceptionally good surface finishes on permanent mold castings.

201 **Temperature Regulators**—LESLIE CO.—Selection sizing and capacity data on temperature regulators for storage type heating and cooling.

• **Math Reference**—PERCE MATHFASTER—Circular Table simplifies frequently used mechanical calculations by condensing data, eliminates the need for wall charts, etc. $1.00 Box 837, Arleta, Calif.

202 **Brass Tubing**—AVINS INDUSTRIAL PRODUCTS CORP.—Specifications Sheet and Information on precision tolerance seamless brass tubing.

203 **Rust Preventative**—E. F. HOUGHTON & CO.—Data on a transparent plastic, dry film, rust preventative that is easy to remove.

FINISHING

208 **Cleaning Barrels**—PANGBORN CORP.—16-page Brochure describes its standard-duty line of blast cleaning barrels.

209 **Fume Control**—METAL & THERMIT CORP.—Information and technical data on a new compound for automatic control of fumes and spray that escapes from chromium plating solutions.

210 **Plating Compounds**—METAL & THERMIT CORP.—Brochure describes its chromium plating compounds which control the amount of chromic acid that escapes from the solution during operation.

211 **Barrel Plating**—FREDERICK B. STEVENS, INC.—12-page Brochure is devoted to automatic loading systems as used with barrel plating and processing equipment.

212 **Recorder**—MINNEAPOLIS-HONEYWELL REGULATOR CO.—Catalog lists a complete line of charts and inks for recorders.

213 **Balance**—FEDERAL PACIFIC ELECTRIC CO.—Information on a new precision balance for research, production, quality control, and analytical work.

214 **Metal Finishing**—ARMOUR ALLIANCE INDUSTRIES—Brochure describes No-Load, a special zinc stearate treated material used in abrasive finishing.

215 **Rust Preventative**—OAKITE PRODUCTS, INC.—Bulletin describes procedures for preventing and removing rust.

continued on page 54

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COST SAVING: 60%

That's how much Jamieson Laboratories estimate they save by die casting this blower housing from Zamak instead of stamping from steel. Only with a zinc die casting can they get the rugged ***thin-wall*** construction they need—***tough enough*** to take the shocks and vibration encountered in use, yet with thin-wall sections ***ductile enough*** to take extensive blanking and forming operations after casting. Neither competitive die casting material—aluminum or magnesium—nor the leading injection molded plastics, can meet these demands.

"The design is highly functional and extremely low cost compared to other methods of manufacture," says Jamieson. Can you say that of your own choice of fabrication? Are you getting your metal's worth? Remember—Zamak gives you more for less.

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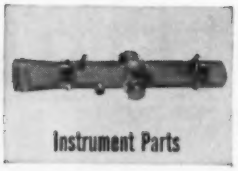
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DIE CASTINGS CHOOSE ADVANCE

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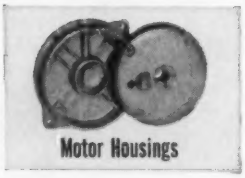
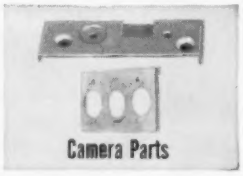
above and beyond the measurable factors of metallurgical control and mechanical equipment (which others may also possess to a degree) there are at ADVANCE creative engineering, in-plant tool making, production skill and management attitudes toward customer requirements not always encountered in run-of-the-mill markets.

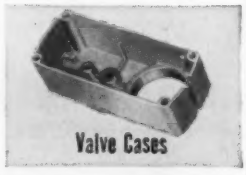
ADVANCE supplies zinc and aluminum components to fine product makers from Texas to Massachusetts as well as to its good neighbors in the Mid-west. Geographical distance is no barrier to quality production.

So . . . check with ADVANCE for your zinc or aluminum die casting requirements.


Motor Housings


Camera Parts

Control Valve Components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38 years of service to industry

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Milwaukee 12, Wis.

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USEFUL LITERATURE

217 **Spray Painting Equipment**—CONFORMING MATRIX CORP.—Illustrated Brochure on nine automatic machines which permit production 100 times faster than hand methods of decoration.

218 **Surface Finishing**—CROWN CITY PLATING CO.—10-page Brochure shows its facilities for polishing, plating, anodizing, and painting die castings.

225 **Milling Cutters**—WETMORE TOOL & ENGINEERING CO.—Catalog describes a line of special cutting tools, including a new indexable insert milling cutter.

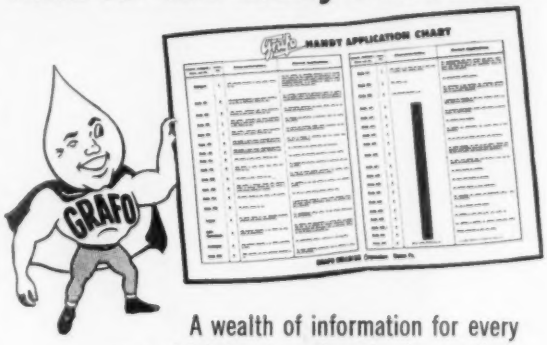
226 **Electroplating**—THE MEAKER CO.—Technical data on a photo resist which blocks off unwanted electroplate and permits accurately defined electroplated patterns.

227 **Nickel Anodes**—METAL & THERMIT CORP.—Data Sheets list prices and ordering information for high purity nickel anodes and salts.

228 **Plating**—HANSON-VAN WINKLE-MUNNING CO.—16-page instruction Booklet tells how to use a nickel sulfamate plating process, includes engineering data.

229 **Finishing Compounds**—ALMCO, QUEEN PRODUCTS DIV.—Information on new burnishing, cleaning, and cut-down compounds for barrel finishing, includes data and processing services.

Send for this handy chart now!



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Samples for specific applications

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Micro-deburring, Smoothing, Cleaning, Polishing

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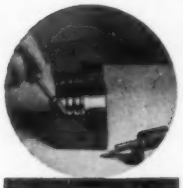
You can count on every Cratex item to perform just as you expect it to—exactly as the last one did and as the next one will. This is the key to efficiency in micro-deburring, smoothing, cleaning and polishing. YOU SAVE TIME because you know just what to expect in performance without experimenting or compensating. YOU SAVE REJECTS because with Cratex no unexpected irregularities occur to spoil work pieces.



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That's right. Haviland's 4-B for Aluminum or 3-G for Zinc can save you up to 50% on Flux costs. How? By separating four times more metal from dross with Haviland fluxes. Many of our customers have found Haviland-separated dross is so low in metal content that pulverizing or mechanical separation is unnecessary . . . and they're getting better alloys, too. Haviland Flux is: FAST — even at lower furnace temperatures where other fluxes might fail. SAFE — less dangerous acrid or stinging fumes.

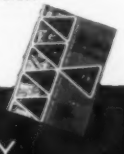
USE HAVILAND 4-B ALUMINUM FLUX

- Greater metal-dross separation
- Works at lower temperature (1250° F)
- Essentially smokeless
- Pulverizing or mechanical separation unnecessary
- Safe in any type of furnace

USE HAVILAND 3-G ZINC FLUX

- Complete metal-dross separation
- Economical — less flux required
- Safe in any type of furnace
- Essentially smokeless

Write for complete information and fluxing procedures.



Haviland
PRODUCTS COMPANY
421 Ann Street, N.W. Grand Rapids, Michigan

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These chips cost money. They represent dollars in wasted materials together with the time and labor cost of extensive and unnecessary machining. You can eliminate all of this through the use of Investment Castings.

Investment Castings will reduce tooling cost, machining time and provide the latitude for designs otherwise impossible.

Send for our Investment Casting Catalogue now. We have representatives in most industrial areas and they'll be happy to discuss your problems with you.

INVESTMENT CASTING

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A Subsidiary of Faradyne Electronics Corp.

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Circle No. 32 on Reader Service Card

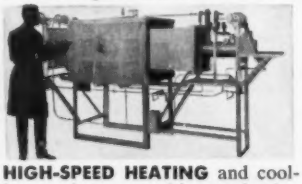
Ed Johnson, Furnace Application Engineer, talks about

SINTERING CERMETS

Whether you're working with cermets, ceramics, refractory metals, or stainless steel powder compacts, Hayes has the *right* furnace and the *right* atmosphere to give you best results at lowest cost.

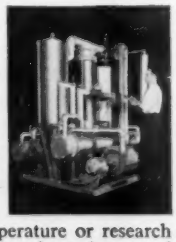
PRECISE SINTERING TEMPERATURES are important for effective bonding of compacts. The Hayes Type M-Y High-Temperature Furnace provides the exact, uniform heating required — has straight-through design for easy operation.

ECONOMICAL, TOO, the Hayes Type M-Y furnace needs only modest power input for temperatures to 3300°F with Moly elements. It can be used with reducing atmospheres for close control research or full-scale production, and is available with metallic or ceramic superhearths.



HIGH-SPEED HEATING and cooling cycles mean big production with the Hayes Model HT/HV Vacuum Furnace. A full-production size vacuum furnace, this Hayes unit is cold-wall designed for compactness as well as operating comfort. Heat-up to 3000°F range and over in minutes, with low voltage elements. High vacuum to 0.1 micron . . . low leak rate.

THE RIGHT ATMOSPHERE is available from the complete Hayes line —ammonia dissociators, endo and exo generators, nitrogen and forming gas generators, gas dryers — all designed for controlled, dependable operation.



WHATEVER YOUR SINTERING PROBLEM — for production, high temperature or research sintering, Hayes know-how and equipment can supply you with a Results Guaranteed answer . . . tested in our lab on shop-scale equipment, and proved by scores of similar installations in industry. Write for bulletins on Hayes sintering furnaces. C. I. Hayes, Inc., 819 Wellington Ave., Cranston 10, R.I.

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Established 1905

It pays to see Hayes for metallurgical guidance, lab. facilities, furnaces, atmosphere generators, gas and liquid dryers, Pow-R-Trol (TM) control units.

Circle No. 25 on Reader Service Card

NEW PRODUCTS

VACUUM GAGE

KINNEY VACUUM DIV., N.Y. AIR BRAKE CO.—The Measuvac TD-1 McLeod type vacuum gage requires no batteries or electrical connections and needs less than 8 ounces of mercury. It may be used as a portable instrument or operated from a fixed mount. Reading capillaries are easily removed for replacement or cleaning.

Circle No. 238 on Reader Service Card

INTERNAL GAGE

SOUTHERN GAGE CO.—The Snap-Plug gage permits both "go" and "no go" to be checked at one

insertion of the gage into the work piece. A simple wrist movement tells whether or not the part is in size.

Circle No. 239 on Reader Service Card

ABRASIVE BANDS

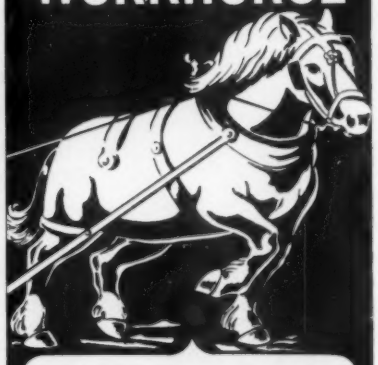
BEHR-MANNING CO.—Abrasive bands and belts have been developed which assume any desired

degree of crown when run on inflatable rubber drums. They are suited for both stock removal and polishing, and work particularly well on concave or other contoured surfaces.

Circle No. 240 on Reader Service Card

your industrial

WORKHORSE



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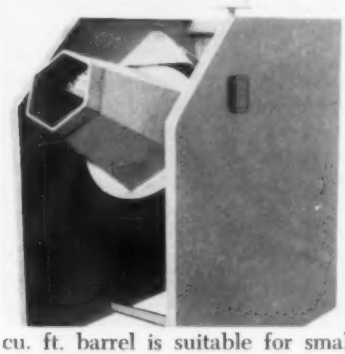
BARREL FINISHER

RAMPE MFG. CO.—Model TC-IV barrel finishing machine has a tilting barrel and 19 to 44 rpm variable or fixed speed drive. The 1.1



cu. ft. barrel is suitable for small lots, pilot operations, or special finishing jobs.

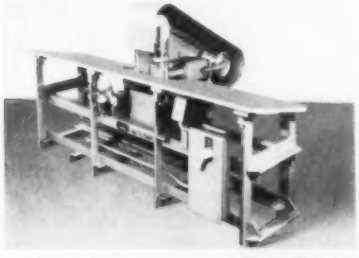
Circle No. 241 on Reader Service Card

FORMING LUBRICANT

ALPHA-MOLYKOTE CORP.—Phosphatherm RN, a metal forming lubricant for use at temperatures between 1100 and 2200°F, prevents galling, scoring and metal pickup when forming most types of common steels, copper alloys, and exotic metals.

Circle No. 242 on Reader Service Card

ABRASIVE BELT HEAD



MURRAY-WAY CORP.—Greatly increased belt life is now available with this new abrasive belt head machine. The abrasive belt travels on a resilient, driven back-up belt which is supported at work position by a steel platen.

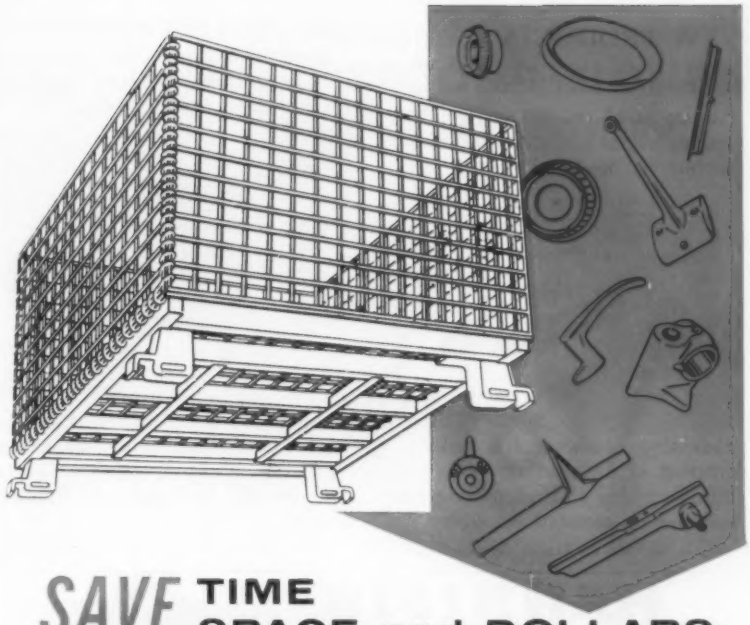
Circle No. 243 on Reader Service Card

BARREL FINISHING MACHINE

LORD CHEMICAL CORP.—The model 610 bench type vibratory finishing machine is designed for the finishing of small and delicate parts. Installation of the 35-lb. capacity unit requires only plugging-in to an electrical outlet.

Circle No. 250 on Reader Service Card

continued on next page



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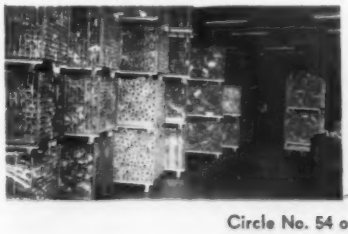
USP PALLETAINERS

Palletainers have simplified material handling problems for Die Casting plants and foundries from coast to coast. These versatile, practically indestructible containers will save time, money and manpower on the production line, in storage and shipping. And . . . Palletainers carry loads of 500 to 6,000 pounds with perfect safety. Form-welded steel legs provide 8-way entry for fork trucks and safe, ceiling-high stacking. Full visibility permits speedy inventory and the sturdy welded steel mesh protects cargo perfectly.

No matter what you manufacture—store or ship, *you need Palletainers!*

Palletainers simplify working storage—save valuable floor space. Stack safely with contents visible.

Palletainers afford a versatile warehouse bin arrangement. Palletainers with side or end gates may be opened or closed without affecting rigidity of stack.



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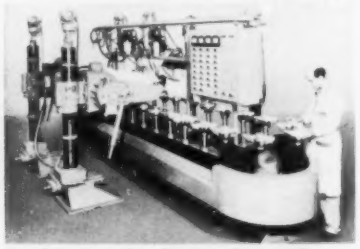
NEW PRODUCTS

POLISHING MACHINE

ACME MFG. CO.—A narrow, line type universal automatic polishing machine is designed for the high

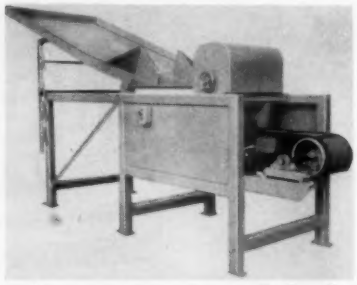


production finishing of a wide assortment of die castings. The machine provides maximum compactness and operational flexibility.

Circle No. 244 on Reader Service Card

VIBRATORY EQUIPMENT

RAMPE MFG. CO.—The Vi-brader is a new type vibratory machine for precision tumble finishing fea-



turing a unique "controlled orbital motion." This feature increases cutting speed up to 90% faster than conventional methods and provides longer tub life.

Circle No. 245 on Reader Service Card

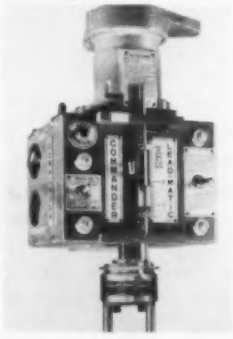
LIQUID WETTING AGENT

CONVERSION CHEMICAL CORP.—A new liquid wetting agent known as Kenvert No. 15-WA has been developed for use with cyanide zinc plating solutions. Originally it was used to emulsify grease and unplug holes in plating barrels. It also stops fumes and decreases build-up of salts on anode bars. It produces grain refinement and limited brightening.

Circle No. 246 on Reader Service Card

DRILL HEAD

COMMANDER MFG. CO.—The model 200 adjustable, two spindle drill head is designed for close center



multiple drilling and tapping work. It may be mounted on any drill press or drill unit to drill or tap two holes at one time. The two spindles may be adjusted to handle a wide variety of hole patterns in a 2" diameter circle.

Circle No. 247 on Reader Service Card

CLEANER—PHOSPHATIZER

MAGNUS CHEMICAL CO.—Bondtite 82-X3 phosphatizer for use in spray washing machines eliminates pH control problems, keeps spray nozzles clean, and combines the cleaning and phosphatizing in one stage. The phosphate coating provides better paint adhesion and more even coverage. Drum is offered on free 30 day trial.

Circle No. 248 on Reader Service Card

WORK BENCHES

EQUIPTO—A series of benches 30" wide by 28" deep offer a portable work surface combined with storage space. Units are available with drawers or with door cabinets, with or without wheels. All drawers are mounted on nylon rollers with latches and padlock attachments as standard equipment.

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Give you more parts per hour

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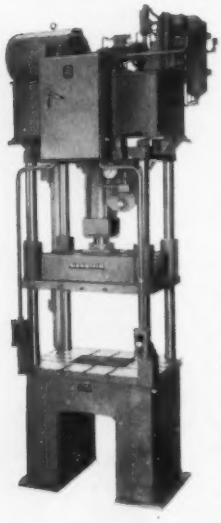

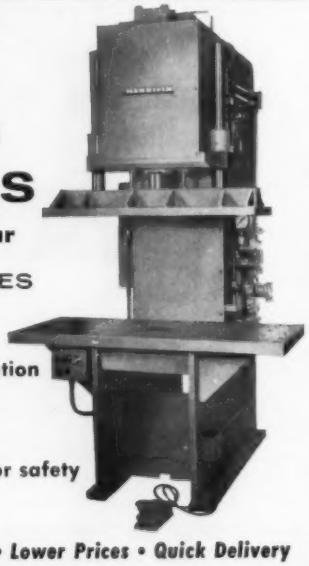

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Quality Production of Large Wax Patterns

SHERWOOD Wax Injection Presses

You can make "Quality" wax patterns when wax is injected at low temperature and high pressure into warmed dies, according to a recent I.C.I. technical report. Sherwood Wax Injection Presses extrude wax at low temperatures, under hydraulic pressure, directly from refillable cylinders. The wax may be in paste form for minimum shrinkage. Improved design Sherwood Presses provide maximum convenience in operation, greater reliability. Several models available—maximum cylinder capacity, 285 cubic inches—makes patterns for up to 80 lbs. of steel or brass. Injection pressures and temperatures adjustable over wide range.

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"Blue Wax" has good hardness, wide "mushy" range, high tensile strength, low expansion rate and low ash content. Your first, low cost trial run will prove its value!

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Portable FLUID RECONDITIONER by Mayhew

Model MBW-1 3 G. P. M. Portable Fluid Purifier.

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Many die casters purify fire-resistant hydraulic fluids while the machine is in operation with one of Mayhew's portable fluid reconditioners. Cost of machine down time, repairs, maintenance man-hours and frequent oil changes is reduced. Large units with flow rates up to 25 G.P.M. are available.

Reinforced bronze element with 15-150 micron rating may be cleaned without removal from housing by back-washing with reverse flow valve. Element need never be replaced. May be used with any type fluid for solid removal only. A machine for any voltage is available. Prices are extremely low. Die casters now using our reconditioning units are listed in our brochure.

With the use of this Unit Pump Suction Filters may be cleaned by Back Washing without removal from Fluid working Reservoir.

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Zinc and Aluminum DIE-CASTINGS

Circle No. 20 on Reader Service Card

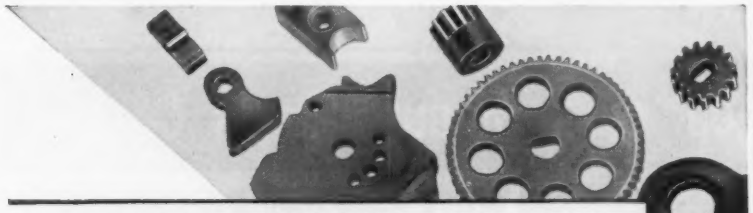
WASHING MACHINE AGITATOR REQUIRES LITTLE BUFFING

DIE CAST WASHING MACHINE AGITATORS for Speed Queen washers have a fine finish at lower production costs. Meta-Mold Aluminum Co., a subsidiary of the Dayton Malleable Iron Co., adopted die casting with good results. Only one-third the previous production operations are now used. Production costs, scrap losses, and finishing costs are less than before.

For agitators that require a high luster, to assure the housewife that her clothes will not snag, die casting was chosen. Die cast surfaces are smooth as cast. Buffing operations are reduced, polishing costs cut.

By designing the part with rounded fan blade edges, a second benefit is realized. There is less stress on the edges during cooling which avoids breaks in the metal. Parting lines are designed at the fan blade edges so that excess metal is easily ground off. Part identification and other design benefits are cast into the part.

THE AGITATOR CASTING is formed in a three-piece sectional die which is made of an Allegheny Ludlum Steel Corp. hot work die steel. The die is 17-inches long and 18-inches in diameter. Previous method of production was by permanent mold.



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Circle No. 21 on Reader Service Card

INVESTMENT CASTING ?

Filtros
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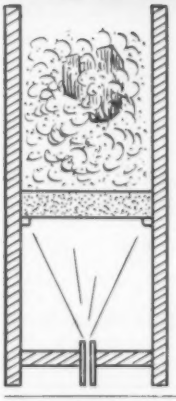

are ideal diffusers for Fluid Bed Particle Coating of Investment Patterns and Shell Mold Patterns.

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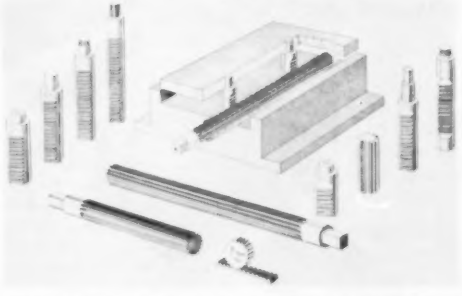

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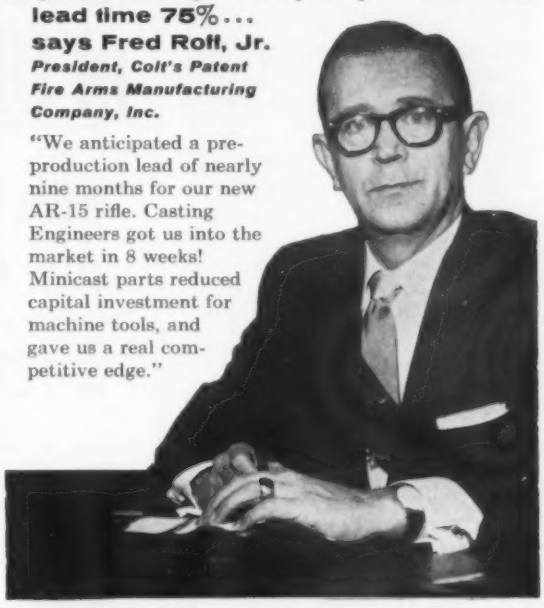
Circle No. 46 on Reader Service Card

Casting Engineers

Improved component quality—and cut our lead time 75%... says Fred Roff, Jr.
President, Colt's Patent Fire Arms Manufacturing Company, Inc.

"We anticipated a pre-production lead of nearly nine months for our new AR-15 rifle. Casting Engineers got us into the market in 8 weeks! Minicast parts reduced capital investment for machine tools, and gave us a real competitive edge."



AR-15 RIFLE

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Cast in tough, chrome-nickel-moly or chrome-moly alloys, these parts were developed from plastic patterns for maximum tolerance control. As cast complex configurations and smooth surfaces eliminate machining, cut costs of secondary operations.

Casting Engineers is an acknowledged leader in investment cast components for firearms. And MINICAST parts set new precision standards for critical applications throughout industry.

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Circle 71 on Reader Service Card

PMM

book review

FUNDAMENTALS OF VACUUM HEAT TREATING; Harold N. Ipsen; Ipsen Industries, Inc., Rockford, Ill., 1960. 46 pages. Price: $2.00.

The development of vacuum heat treating equipment in recent years has permitted a parallel development in vacuum metallurgy techniques and practices. This book outlines these equipment developments as related to the current "state-of-the-art" in vacuum heat treating. Specific chapters deal with the basic physics related to vacuums, process details.

WELDING METALLURGY; Edited by Arthur L. Phillips; American Welding Society, New York, N.Y., 1960. 114 pages.

The demand for authoritative technical literature on welding has prompted the publication of this book on the fundamentals of welding metallurgy. Although quite comprehensive in its own right, this book is actually a reprint of Chapter 3 from Section I of the Fourth Edition of the *Welding Handbook*.

The book not only covers metallurgical considerations such as temperature effects, phase diagrams, grain structure, etc., but also provides a brief review of load and shape considerations effecting material failure.

CHIPLESS MACHINING; Charles H. Wick; The Industrial Press, New York, N.Y., 1960. 502 pages. Price $10.00.

This book deals with the process of moving metal instead of removing it as it pertains to the cold-working of steel. These "chipless machining" processes are listed as heading, rolling, spinning, swaging, impact extruding, and high energy rate forming. The author says his purpose was to accumulate data on these subjects from the information published in widely scattered magazines and technical transactions.

Information on die design, production, and design features offered by each process is included.

Circle No. 24 on Reader Service Card

APPLIANCE TIMER GEAR MADE IN ONE STEP INSTEAD OF 5

with tiny GRC zinc die casting

Shown actual size

This mutilated gear, cam and bushing combination for an electrical appliance timer formerly required two stampings, a screw machined part and two assemblies. Die cast by GRC in one automatic operation **reduced** costs 66%, and made a **superior** product. Closer tolerances and greater uniformity were achieved by casting in one piece, already trimmed, with no secondary operations, no scrap loss. Another demonstration of the production economies and wide design latitude Gries' exclusive methods make possible.

Only the GRC Method gives such complete design freedom for small precision parts.

NO MINIMUM SIZE

Maximum Sizes: 1¾" long, ½ oz.

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Circle No. 48 on Reader Service Card

Dodge Custom-made
Special Alloy Steel Goosenecks

. . . for longer service life

. . . less maintenance

Here's the biggest news in die casting in years: a custom-made special alloy *steel* gooseneck that will outlast and outperform iron and alloy iron goosenecks currently available . . . and provide greater operational savings! Developed through years of experience and association with the die castings industry, Dodge Special Alloy *Steel* Goosenecks provide many advantages:

- Will outlast iron and alloy iron goosenecks by as much as 4-5 years.
- Maintenance problems are fewer because of long service life.
- Down time is reduced to a minimum because of long service life.
- Designed and made of special alloy *steel*, they prevent cracking . . . bottom breakout . . . spout erosion.

Each Dodge Special Alloy *Steel* Gooseneck is custom made to specifications by the Finished Products Division of Dodge Steel Company. Facilities are available for producing any size gooseneck for any die casting machine. Goosenecks are furnished either rough machined or machined with sleeves. Dodge provides a complete engineering service in the designing and production of steel goosenecks.

Your inquiries are solicited, without obligation, of course. Ask too, about pots and other die casting machine parts including nozzles, spouts, plungers, etc.

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FINISHED PRODUCTS DIVISION
6501 Tacony Street
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THE MOST IMPORTANT ALLOY IN A STEEL CASTING IS QUALITY

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PMM

opportunities

jobs and equipment

Opportunities rates: $20 for the first column-inch; $15 for each additional column-inch payable in advance. To answer box number advertisements, address responses to the box at Precision Metal Molding, 812 Huron Road, Cleveland 15, Ohio. Closing date: 1st day of month preceding publication.

POSITION OPEN

DIE CASTING SUPERVISOR — Opportunity available for man with 10 or more years' experience, aluminum die casting for training operators on die casting machines and furnaces. Candidate must know Lester-Phoenix and/or Cast-Master operation, be able to direct repairs, maintenance; to function on 3-shift basis, auditing all operators. Should audit die designs, blue prints, "De-bug" old dies. Outstanding pay and benefits with General Electric Company Outdoor Lighting Department located in beautiful mountain resort area. Prefer man with technical or college background. Please send resume to Specialist — Employment, GE, Hendersonville, North Carolina.

WANTED—SALES REPRESENTATIVES by Die Casting Subsidiary of large corporation. Company located in East. Presently expanding production facilities. Box 2261.

A FAST GROWING mid-west Zinc and Aluminum Die Casting Company is seeking:

A—Die Cast Superintendent
B—Die Cast Engineer
C—Die Cast Foreman
D—Tool Room Foreman

Box 2361.

HELP WANTED—METALLURGIST—with investment casting experience. Forward resume with salary requirements. Location—Philadelphia area. Box 2461.

HELP WANTED—PROCESS ENGINEER to work on development and research projects in investment casting foundry. Applicant should have experience in this field and educational background of chemistry and/or metallurgy. Send application with complete resume to: Casting Engineers, 2323 N. Bosworth Ave., Chicago 14, Ill.

AGENCY AVAILABLE

TWO AGGRESSIVE MANUFACTURER'S AGENTS with an office in Detroit who have sold to die casters and the automotive industry in the Midwest for 12 years seek additional quality lines. Our contacts and experience will assure you proper presentation of your products. Box 2161.

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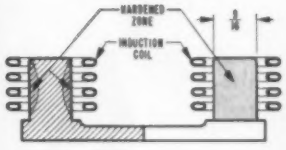
Typical Induction Heating Applications

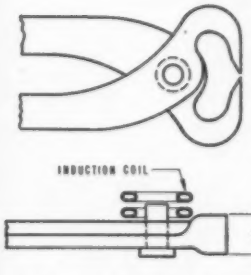
Steel Bosses Selectively Hardened



Bosses on part shown are locally hardened to increase resistance to wear and plastic yielding. Surface hardening by induction provides hardness pattern indicated and hardness of Rc 57/59 for 1040 steel when quenched in water.

Our engineers will process your work samples and return the completed job with full data and recommendations without cost or obligation.

Hot Forming Aids Production Assembly of Nippers



The ends of high-strength steel rivets are selectively heated to 1700° F for hot upsetting. Design of coil permits movement of upsetting tool through the coil.

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DIE CASTING *by* HOOVER

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To ***zinc alloy*** *die casters:* **these**

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firsts help you make your zinc castings right the first time (and every time)

Apex was a pioneer and continues as a major influence in the development and production of the all-primary special high grade zinc base die casting alloys. Our program continues—research and testing to improve and produce better alloys for your use.

Just name it—standard or your own particular specifications—and Apex will produce it *as ordered* with rigid electronic composition control. You're then set to improve your production, gain the benefits of Apex initiative in producing quality zinc alloys.

Call today for prompt, helpful attention.

Circle No. 11 on Reader Service Card

FIRST in commercial production and sale of zinc base die casting alloy ingot containing 4% aluminum made from high grade zinc. Production started October, 1924.

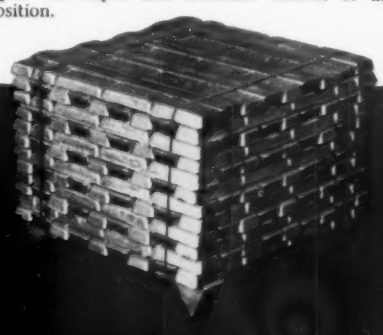
FIRST to use 99.99 plus pure zinc when it became available in 1928.

FIRST to develop the lower magnesium contents, .03 to .05%, which eliminated the hot shortness characteristics experienced with .10% magnesium and at the same time was sufficient to prevent the intercrystalline corrosion. Apex promoted in 1931 the first ASTM specification written for zinc base die casting alloys.

FIRST to establish and publish information on the effects of metal and die temperatures on different alloy compositions through actual die casting of thousands of test bars. Apex "Metalgrams" showing these effects were initiated in 1931 and continued through 1945.

FIRST to use large capacity refractory lined furnaces for alloying, replacing the conventional iron metal pots. The larger heats established a uniformity of composition not previously attainable. Iron pickup also was eliminated.

FIRST to employ Quantometers—direct reading spectrographs—for rapid and accurate control of alloy composition.



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